Hydrofluorocarbon Blends and Components from China

Investigation No. 731-TA-1279 (Final)

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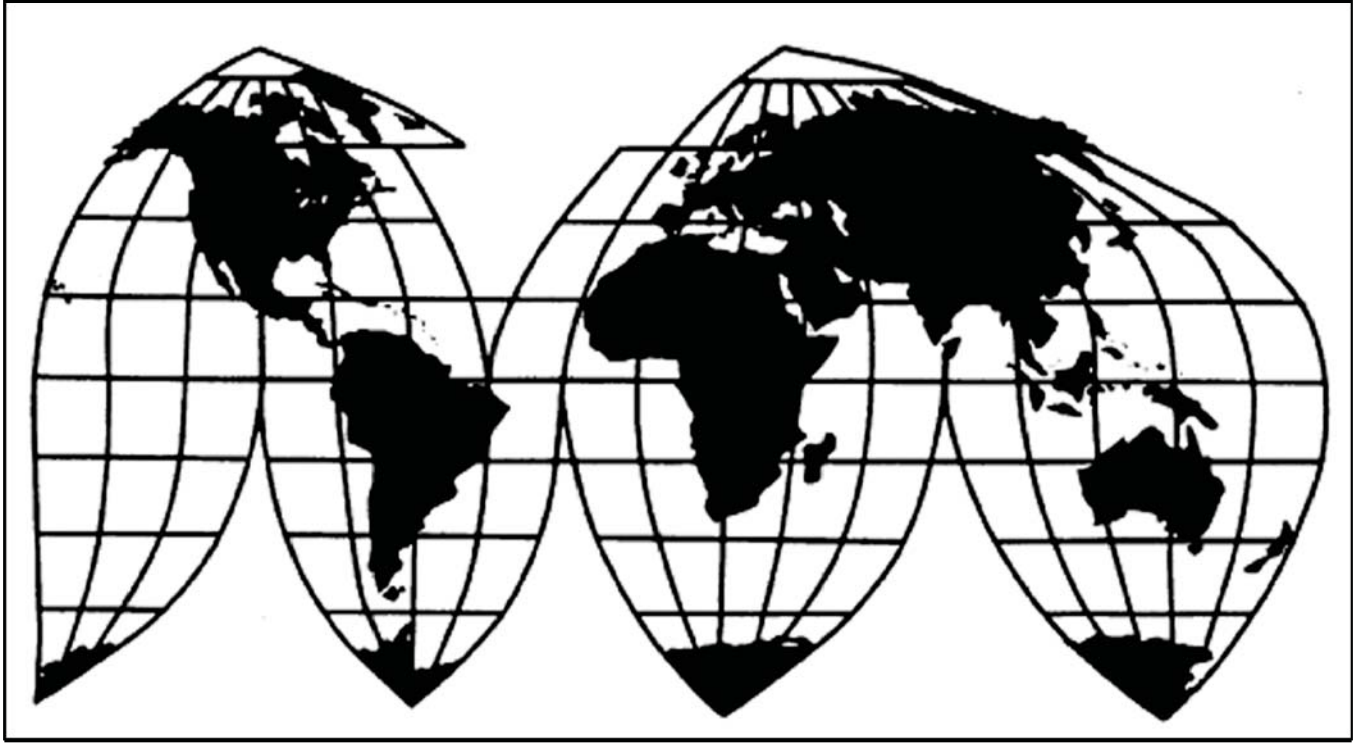
U.S. International Trade Commission



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Note.--Information that would reveal confidential operations of individual concerns may not be published and therefore has been deleted. Such deletions are indicated by astericks.

UNITED STATES INTERNATIONAL TRADE COMMISSION

Investigation No. 731-TA-1279 (Final)

Hydrofluorocarbon Blends and Components from China

DETERMINATION

On the basis of the record[1] developed in the subject investigation, the United States International Trade Commission ("Commission") determines, pursuant to the Tariff Act of 1930 ("the Act"), that an industry in the United States is materially injured by reason of imports of hydrofluorocarbon ("HFC") blends from China, provided for in subheading 3824.78.00 of the Harmonized Tariff Schedule of the United States, that have been found by the Department of Commerce ("Commerce") to be sold in the United States at less than fair value ("LTFV").[2] The Commission further determines that a U.S. industry is not materially injured or threatened with material injury by reason of imports of HFC components from China.

BACKGROUND

The Commission, pursuant to section 735(b) of the Act (19 U.S.C. 1673d(b)), instituted this investigation effective June 25, 2015, following receipt of a petition filed with the Commission and Commerce by the American HFC Coalition, and its members: Amtrol, Inc., West Warwick, Rhode Island; Arkema, Inc., King of Prussia, Pennsylvania; The Chemours Company FC, LLC, Wilmington, Delaware; Honeywell International Inc., Morristown, New Jersey; Hudson Technologies, Pearl River, New York; Mexichem Fluor Inc., St. Gabriel, Louisiana; Worthington Industries, Inc., Columbus, Ohio; and District Lodge 154 of the International Association of Machinists and Aerospace Workers.[3] The Commission scheduled the final phase of the investigation following notification of a preliminary determination by Commerce that imports of hydrofluorocarbon blends and components from China were being sold at LTFV within the meaning of section 733(b) of the Act (19 U.S.C. 1673b(b)). Notice of the scheduling of the final phase of the Commission's investigation and of a public hearing to be held in connection therewith was given by posting copies of the notice in the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and by publishing the notice in the *Federal Register* of March 1, 2016 (81 FR 10662). The hearing was held in Washington, DC, on June 21, 2016, and all persons who requested the opportunity were permitted to appear in person or by counsel.

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[1] The record is defined in sec. 207.2(f) of the Commission's Rules of Practice and Procedure (19 CFR 207.2(f)).

[2] The Commission also finds that imports subject to Commerce's affirmative critical circumstances determination are not likely to undermine seriously the remedial effect of the antidumping duty order on HFC blends from China.

[3] The Commission did not grant Amtrol, Inc. and Worthington Industries, Inc. interested party status because neither qualifies as an interested party under 19 § U.S.C. 1677(9). Neither firm produces or blends the subject products.

Views of the Commission

Based on the record in the final phase of this investigation, we determine that an industry in the United States producing hydrofluorocarbon ("HFC") blends is materially injured by imports of HFC blends from China found by the U.S. Department of Commerce ("Commerce") to be sold in the United States at less than fair value ("LTFV"). We further determine that an industry in the United States producing HFC components is neither materially injured nor threatened with material injury by reason of imports of HFC components from China found by Commerce to be sold in the United States at LTFV.

I. Background

Parties to the Investigation. The petition in this investigation was filed by The American Hydrofluorocarbon Coalition and its individual members ("Petitioners"), including Amtrol, Inc., West Warwick, RI; Arkema, Inc., King of Prussia, PA ("Arkema"); The Chemours Company FC, LLC, Wilmington, DE ("Chemours"); Honeywell International, Inc., Morristown, NJ ("Honeywell"); Hudson Technologies, Pearl River, NY ("Hudson"); Mexichem Fluor, Inc., St. Gabriel, LA; and Worthington Industries, Inc., Columbus, OH, each of which is a domestic producer of HFC blends or components, and the District Lodge 154 of the International Association of Machinists and Aerospace Workers, which represents workers producing such products.[1] [2] Petitioners appeared at the hearing and submitted prehearing and posthearing briefs.[3]

[1] The Chinese Respondents have alleged that the American HFC Coalition does not have standing to bring the petition on behalf of the U.S. industries producing HFC blends and components because a majority of its members are not producers of either of the domestic like products. *See* Chinese Respondents Prehearing Brief at 5-7 and Final Comments at 1. Under the statute, the administering authority, Commerce, is charged with the responsibility of reviewing a petition and determining whether the petition alleges the elements necessary for the imposition of an antidumping or countervailing duty, including the explicit authority to determine whether the petition was filed by or on behalf of the industry. *See* 19 U.S.C. §§ 1673a(a) and 1673a(c)(1)(A)(ii). Furthermore, the statute expressly states that "[a]fter the administering authority makes a determination with respect to initiating an investigation, the determination concerning industry support shall not be reconsidered." 19 U.S.C. § 1673a(c)(4)(E). Commerce determined upon initiation that the petition had the requisite industry support and indicated the petitioners, including the American HFC Coalition, were proper petitioning parties. *See Hydrofluorocarbon Blends and Components Thereof From the People's Republic of China; Initiation of Less-Than-Fair-Value Investigation*, 80 Fed. Reg. 43387 (July 22, 2015). Under the statute, this determination is final.

[2] Amtrol, Inc., and Worthington Industries, Inc., produce cylinders and storage tanks for HFC blends and components. The Commission did not grant either company interested party status because neither qualified as an interested party under the statute. 19 § U.S.C. 1677(9); *see* Confidential Report ("CR") at I-1 n.1, Public Report ("PR") at I-1 n.1.

[3] CR at I-2, PR at I-1.

Several respondent entities participated in the investigation. These included a coalition of nine producers and exporters of the subject merchandise and the Chinese Chamber of Commerce (collectively, the "Chinese Respondents"); National Refrigerants, Inc., a domestic producer of HFC blends and an importer of HFC components from China ("National"); ICOR International Inc. ("ICOR"), a domestic producer/reclaimer of HFC blends;[4] New Era Group, a trade association consisting of producers of HFC blends and components from China ("New Era");[5] and Daikin America, Inc., an importer of subject merchandise. National and the Chinese Respondents appeared at the hearing and submitted prehearing and posthearing briefs.

Data Coverage. U.S. industry data are based on the questionnaire responses of five firms (***) that accounted for all domestic production of in-scope HFC components and the vast majority of domestic production of HFC blends during 2015.[6] Because official Commerce import statistics include out-of-scope merchandise, U.S. import data are based on questionnaire responses from 16 U.S. importers accounting for more than one-third of the subject merchandise imported under the most relevant HTS statistical reporting numbers.[7] Chinese industry data are based on the questionnaire responses of 16 foreign producers and exporters of subject merchandise whose exports to the United States accounted for *** percent of total imports of in-scope components and *** percent of total imports of in-scope blends from China in 2015.[8]

II. Domestic Like Product

A. General

In determining whether an industry in the United States is materially injured or threatened with material injury by reason of imports of subject merchandise, the Commission first defines the "domestic like product" and the "industry."[9] Section 771(4)(A) of the Tariff Act of 1930, as amended ("The Tariff Act"), defines the relevant domestic industry as the

[4] ICOR filed a prehearing brief. It appeared at the hearing. It provided limited posthearing argument as part of National's posthearing brief. *See* National Posthearing Brief at A-65 to A-67 and Exhibits 9 to 11. ICOR is a member of a group of HFC blenders known as "reclaimers." CR/PR at III-2 n.5.

[5] New Era filed a prehearing statement. It did not provide testimony at the hearing nor did it make a posthearing submission.

[6] CR/PR at III-1. Arkema, Chemours, and Honeywell produce in-scope HFC blends, in-scope HFC components, and out-of-scope refrigerant blends. National is the largest stand-alone HFC blender in the United States. CR at III-19, PR at III-8. ICOR is an independent blender that produces ***, but which also *** during the 2013 to 2015 period of investigation (POI). CR at III-20, PR at III-8. The Commission also received some information from additional independent blenders/reclaimers. Golden Refrigerant is an independent blender/reclaimer and reported ***. The remaining responding U.S. blenders/reclaimers, ***, did not provide useable data on their HFC blending operations. CR at III-21, PR at III-8.

[7] CR/PR at IV-1 to IV-2 and n.4.

[8] CR at VII-4 and n.6, PR at VII-3 and n.6.

[9] 19 U.S.C. § 1677(4)(A).

"producers as a whole of a domestic like product, or those producers whose collective output of a domestic like product constitutes a major proportion of the total domestic production of the product."[10] In turn, the Tariff Act defines "domestic like product as "a product which is like, or in the absence of like, most similar in characteristics and uses with, the article subject to an investigation."[11]

The decision regarding the appropriate domestic like product in an investigation is a factual determination, and the Commission has applied the statutory standard of "like" or "most similar in characteristic and uses" on a case by case basis.[12] No single factor is dispositive, and the Commission may consider other factors it deems relevant based on the facts of a particular investigation.[13] The Commission looks for clear dividing lines among possible like products and disregards minor variations.[14] Although the Commission must accept Commerce's determination as to the scope of the imported merchandise that is subsidized or sold at less than fair value,[15] the Commission determines what domestic product is like the imported articles Commerce has identified.[16]

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[10] 19 U.S.C. § 1677(4)(A).

[11] 19 U.S.C. § 1677(10).

[12] *See, e.g.*, *Cleo Inc. v. United States*, 501 F.3d 1291, 1299 (Fed. Cir. 2007); *NEC Corp. v. Department of Commerce*, 36 F. Supp. 2d 380, 383 (Ct. Int'l Trade 1998); *Nippon Steel Corp. v. United States*, 19 CIT 450, 455 (1995); *Torrington Co. v. United States*, 747 F. Supp. 744, 749 n.3 (Ct. Int'l Trade 1990), aff'd, 938 F.2d 1278 (Fed. Cir. 1991) ("every like product determination 'must be made on the particular record at issue' and the 'unique facts of each case'"). The Commission generally considers a number of factors, including the following: (1) physical characteristics and uses; (2) interchangeability; (3) channels of distribution; (4) customer and producer perceptions of the products; (5) common manufacturing facilities, production processes, and production employees; and, where appropriate, (6) price. *See Nippon*, 19 CIT at 455 n.4; *Timken Co. v. United States*, 913 F. Supp. 580, 584 (Ct. Int'l Trade 1996).

[13] *See,* e.*g.*, S. Rep. No. 96-249 at 90-91 (1979).

[14] *Nippon*, 19 CIT at 455; *Torrington*, 747 F. Supp. at 748-49; *see also* S. Rep. No. 96-249 at 90-91 (Congress has indicated that the like product standard should not be interpreted in "such a narrow fashion as to permit minor differences in physical characteristics or uses to lead to the conclusion that the product and article are not 'like' each other, nor should the definition of 'like product' be interpreted in such a fashion as to prevent consideration of an industry adversely affected by the imports under consideration.").

[15] *See*, *e.g., USEC, Inc. v. United States*, 34 Fed. Appx. 725, 730 (Fed. Cir. 2002) ("The ITC may not modify the class or kind of imported merchandise examined by Commerce."); *Algoma Steel Corp. v. United States*, 688 F. Supp. 639, 644 (Ct. Int'l Trade 1988), *aff'd*, 865 F.3d 240 (Fed. Cir.), *cert. denied*, 492 U.S. 919 (1989).

[16] *Hosiden Corp. v. Advanced Display Mfrs*., 85 F.3d 1561, 1568 (Fed. Cir. 1996) (the Commission may find a single like product corresponding to several different classes or kinds defined by Commerce); *Cleo*, 501 F.3d at 1298 n.1 ("Commerce's {scope} finding does not control the Commission's {like product} determination."); *Torrington*, 747 F. Supp. at 748-52 (affirming the Commission's determination defining six like products in investigations in which Commerce found five classes or kinds).

B. Product Description

In its final determination, Commerce defined the imported merchandise within the scope of this investigation as follows:

> The products subject to this investigation are HFCs and single HFC components of those blends thereof, whether or not imported for blending. HFC blends covered by the scope are R-404A, a zeotropic mixture consisting of 52 percent 1,1,1-Trifluoroethane, 44 percent Pentafluoroethane, and 4 percent 1,1,1,2-Tetrafluoroethane; R-407A, a zeotropic mixture of 20 percent Difluoromethane, 40 percent Pentafluoroethane, and 40 percent 1,1,1,2-Tetrafluoroethane; R-407C, a zeotropic mixture of 23 percent Difluoromethane, 25 percent Pentafluoroethane, and 52 percent 1,1,1,2-Tetrafluoroethane; R-410A, a zeotropic mixture of 50 percent Difluoromethane and 50 percent Pentafluoroethane; and R-507A, an azeotropic mixture of 50 percent Pentafluoroethane and 50 percent 1,1,1-Trifluoroethane also known as R-507. The foregoing percentages are nominal percentages by weight. Actual percentages of single component refrigerants by weight may vary by plus or minus two percent points from the nominal percentage identified above.
>
> The single component HFCs covered by the scope are R-32, R-125, and R-143a. R-32 or Difluoromethane has the chemical formula CH_2F_2, and is registered as CAS No. 75-10-5. It may also be known as HFC-32, FC-32, Freon-32, Methylene difluoride, Methylene fluoride, Carbon fluoride hydride, halocarbon R32, fluorocarbon R32, and UN 3252. R-125 or 1,1,1,2,2-Pentafluoroethane has the chemical formula CF_3CHF_2 and is registered as CAS No. 354-33-6.
> R-125 may also be known as HFC-125, Pentafluoroethane, Freon 125, and Fc-125, R-125. R-143a or 1,1,1-Trifluoroethane has the chemical formula CF_3CH_3 and is registered as CAS No. 420-46-2. R-143a may also be known as HFC-143a, Methylfluoroform, 1,1,1-Trifluoroform, and UN2035.
>
> Also included are semi-finished blends of Chinese HFC components. Except as described below, semi-finished blends are of two Chinese HFC components (*i.e.*, R-32, R-125, and R-143a), as well as blends of any one of these components with Chinese R-134a, that are used to produce the subject HFC blends that have not been blended to the specific proportions required to meet the definition of one of the subject HFC blends described above (R-404A, R-407A, R-407C, R-410A, and R-507A).
>
> This investigation includes any Chinese HFC components (*i.e.*, R-32, R-125, and R-143a), as well as Chinese 134a, that are blended in a third country to produce a subject HFC blend before being imported into the United States. Chinese R-134a is not subject to the scope of this investigation unless it is blended with another

Chinese HFC component (*i.e.*, R-32, R-125, and R-143a) into a subject blend or semi-finished blend before being imported into the United States.

Any blend or semi-finished blend that includes an HFC component other than R-32, R-125, R-143a, or R-134a is excluded from the scope of this investigation. Furthermore, semi-finished blends do not include any blends containing both HFCs R-32 and R-143a. Single-component HFC blends and semi-finished blends are not excluded from the scope of this investigation when blended with HFCs from non-subject countries.

Excluded from this investigation are blends of refrigerant chemicals that include products other than HFCs, such as blends including chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), or hydrofluoroolefins (HFOs).

Also excluded from this investigation are patented HFC blends, including, but not limited to, ISCEON® blends, including MO99™ (RR-438A), MO79 (R-422A), MO59 (R-417A), MO49Plus™ (R-437A) and MO29™ (R-422D), and Genetron® Performax™ LT (R-407F), Choice® R-421A, and Choice® R-421B.

HFC blends covered by the scope of this investigation are currently classified in the Harmonized Tariff Schedule of the United States (HTSUS) at subheadings 3824.78.0020 and 3824.78.0050. Single component HFCs are currently classified at subheadings 2903.39.2035 and 2903.39.2045, HTSUS. Although the HTSUS subheadings and CAS registry numbers are provided for convenience and customs purposes, the written description of the scope is dispositive.[17]

The scope encompasses the five major HFC blends sold in the U.S. market: R-404A, R-407A, R-407C, R-410A, and R-507A.[18] HFC blends are colorless, odorless gasses containing only hydrogen, fluorine, and carbon, and are used as low-to-medium temperature refrigerants in residential and commercial air conditioning systems, as well as commercial, transport, and process refrigeration applications.[19] They were developed as ozone-friendly replacements for CFCs and HCFCs, such as R-22, which deplete the ozone layer and are being phased out

[17] *Hydrofluorocarbon Blends and Components Thereof from the People's Republic of China: Final Determination of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances*, 81 FR 42314, 42315 (June 29, 2016), and accompanying *Issues and Decision Memorandum* at Appendix I ("*Commerce Final Determination*"). We have omitted several footnotes from the scope definition, one of which states that "if the only Chinese component of such a third country blend is the R-134a portion, then such a third country blend is excluded from the scope of this investigation."

[18] CR at I-10 to I-12, PR at I-7 to I-9.

[19] CR at I-13, I-19 to I-20, PR at I-7 to I-9.

pursuant to the Montreal Protocol.[20] Unlike CFCs and HCFCs, HFCs have no ozone depleting potential because they do not contain chlorine.[21]

The scope also encompasses three of the four HFC components (R-32, R-125, and R-143a) used to produce the five in-scope HFC blends. The fourth HFC component used to produce HFC blends, R-134a, is expressly excluded from the scope of the investigation.[22] All in-scope HFC blends are made from R-125 and one or two more of the other HFC components blended in precise ratios.[23] The record indicates that a substantial portion of domestic production of in-scope HFC components is consumed in the production of HFC blends.[24]

C. Arguments and Analysis

In its preliminary determination, the Commission defined the domestic like product to consist of the HFC blends and HFC components described in the scope of the investigation using its semi-finished product analysis because the issue involved products at different stages of processing.[25] Petitioners contended that the Commission should define a single like product consisting of all HFC blends and components within the scope definition.[26] The Commission considered National's and the Chinese Respondents' arguments that the Commission should define HFC blends and HFC components as separate like products.[27] The Commission declined to adopt the respondent parties' proposal and instead defined a single domestic like product consisting of HFC blends and HFC components within Commerce's scope definition for purposes of its preliminary determination. It stated that it would examine the issue further in any final phase of the investigation.[28]

In the final phase of this investigation, Petitioners request that the Commission define a single domestic like product matching the products in the scope definition for the reasons discussed in the Commission's preliminary determination.[29] National and the Chinese Respondents request that the Commission find that the HFC blends and HFC components

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[20] CR at I-18 and n.25, PR at I-11 and n.25.

[21] CR at I-11, PR at I-7.

[22] The Commission has recently conducted investigations on R-134a. *See 1,1,1,2-Tetrafluoroethane from China*, Inv. Nos. 701-TA-509, 731-TA-1244 (Final), USITC Pub. 4503 (Dec. 2014), *aff'd*, *Mexichem Fluor Inc. v. United States*, Slip Op. 16-54 (Ct. Int'l Trade June 6, 2016); *1,1,1,2 – Tetraflouroethane (R-134a) from China*, Inv. No. 731-TA-1313 (Preliminary), USITC Pub. 4606 (Apr. 2016) ("*R-134a Preliminary*").

[23] CR/PR at Table I-2.

[24] CR/PR at Table I-4.

[25] *Preliminary Determination*, USITC Pub. 4558, at 9.

[26] Petition at 7.

[27] National Postconference Brief at 6-26; Chinese Respondents Postconference Brief at 9-10.

[28] *Preliminary Determination*, USITC Pub. 4558, at 9.

[29] *Preliminary Determination*, USITC Pub. 4558, at 9; *see also* Petitioners Prehearing Brief at 11-12, Posthearing Brief at 2-4, and Final Comments at 2-7.

within the scope definition are two separate like products.[30] Petitioners and the responding parties agree that R-134a and the out-of-scope blends should not be part of any domestic like product defined by the Commission in this investigation.[31]

In the following sections, we consider (1) whether the definition of the domestic like product should include R-134a; (2) whether the definition of the domestic like product should include out-of-scope refrigerant blends; and (3) whether HFC components are a distinct domestic like product from HFC blends.

1. Whether the Commission Should Define the Domestic Like Product to Include Out-of-Scope R-134a

We first address the issue of whether R-134a should be included in the domestic like product. The record indicates fundamental distinctions in characteristics and uses between R-134a and the merchandise within the scope. R-134a possesses the physical characteristics that enable it to be used as a stand-alone refrigerant.[32] It is sold directly to original equipment manufacturers ("OEMs") and to the end user market as a stand-alone refrigerant, typically for use in automotive applications.[33] Thus, its characteristics and uses differ from the in-scope HFC components, which are not interchangeable with R-134a in refrigerant applications.[34] The market for in-scope HFC components mainly consists of HFC blenders and, to a much lesser degree, some non-refrigerant applications.[35] Thus, the markets, channels of distribution, and perceptions of market participants are different for in-scope HFC components and R-134a. Finally, the majority of U.S. producers reported that R-134a is produced using different manufacturing processes, raw materials, and facilities than those used for the production of in-

[30] National Prehearing Brief at 10, Posthearing Brief at 7-11; Chinese Respondents Prehearing Brief at 7, Posthearing Brief at 1-4. In addition, ICOR argues that R-125 should be considered a separate like product under either the traditional six-factor test or the semi-finished product analysis because R-125 is produced in different facilities than HFC blends containing R-125, is not interchangeable with HFC blends containing R-125, has stand-alone uses, and is used to make out-of-scope refrigerant blends, as well as its use as component for the production of in-scope HFC blends. ICOR Prehearing Brief at 5-6. In light of ICOR's statement that it was asserting this argument only as an alternative if the Commission should not find that components and blends are separate like products, we do not discuss it in detail. Hearing Transcript at 194 (Morgan). The record does not indicate any clear distinction between R-125 and the other in-scope components. Similar to the other in-scope components, R-125 is used almost exclusively as a component in blends. CR/PR at Table I-4. Similar to the other in-scope components, R-125 is used to produce both in-scope and out-of-scope blends. CR/PR at Table I-15. Channels of distribution for R-125 are similar to those for the other two in-scope blends. CR/PR at Table I-4. The same process is used to incorporate R-125 into a blend as that for other in-scope components. CR/PR at Table I-9.

[31] Petitioners Prehearing Brief at 15-19; National Prehearing Brief at 6 n.4 and Posthearing Brief, Appendix at A-6 to A-7, A-96 to A-97; Chinese Respondents Posthearing Brief at 4-5.

[32] *See* CR/PR at Table I-13.

[33] *See generally R-134a Preliminary*, USITC Pub. 4606 at 12.

[34] *See* CR/PR at Table I-12.

[35] CR/PR at Table I-15.

scope HFC components or HFC blends.[36] We consequently find that R-134a should not be included in the same domestic like product as in-scope HFC components or HFC blends.

2. Whether the Commission Should Define the Domestic Like Product Broader Than the Scope to Include All Refrigerant Blends Containing an HFC Component

We next address whether the domestic like product should be defined more broadly than the scope to include all refrigerant blends containing an in-scope HFC component. Petitioners and the responding parties agree that out-of-scope refrigerant blends containing an in-scope HFC component should not be included in the definition of the domestic like product.[37] Again, the record indicates some significant distinctions in characteristics and uses between the in-scope HFC blends and the out-of-scope refrigerant blends (which include other HFC blends, chlorine-containing CFCs and HCFCs, and next-generation hydrofluoroolefins ("HFOs")). Although some out-of-scope refrigerant blends may have similar end uses and channels of distribution as in-scope HFC blends, differences in the physical characteristics between the out-of-scope and in-scope refrigerant blends typically preclude interchangeability or would require redesign of equipment or reformulating of systems for use in the same equipment.[38] There are also differences in producer and customer perceptions between out-of-scope blends and in-scope blends, and the out-of-scope blends command much higher average unit values than in-scope HFC blends.[39] In light of these considerations and the fact that no party supports defining the domestic like product to include out-of-scope blends, we find that out-of-scope refrigerant blends should not be included in the domestic like product.

3. Treatment of HFC Components and HFC Blends As Separate Like Products

Finally, we address the argument advanced by National, and supported by the Chinese Respondents, that HFC components should be a distinct domestic like product from HFC blends. Because this issue involves products at different stages of processing, we analyze the question using our semi-finished products analysis.[40] Based on our analysis, we define two domestic like products, one comprised of HFC blends and one comprised of HFC components.

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[36] CR/PR at Table I-11.

[37] Petitioners Prehearing Brief at 15-19; National Prehearing Brief at 6 n.4 and Posthearing Brief, Appendix at A-6 to A-7, A-96 to A-97; Chinese Respondents Posthearing Brief at 4-5.

[38] CR at I-46, PR at I-30, and CR/PR at Tables I-18, I-28, and II-6.

[39] CR at Tables I-21 and I-24.

[40] In a semi-finished product analysis, the Commission currently examines: (1) whether the upstream article is dedicated to the production of the downstream article or has independent uses; (2) whether there are perceived to be separate markets for the upstream and downstream articles; (3) differences in the physical characteristics and functions of the upstream and downstream articles; (4) differences in the costs or value of the vertically differentiated articles; and {5) significance and extent of the processes used to transform the upstream into the downstream articles.

Dedication for Use. A majority of the in-scope HFC components produced in the United States are internally consumed, swapped, or sold to independent HFC blenders for the production of in-scope blends. Nevertheless, consumption of domestically produced in-scope HFC components for the production of out-of-scope HFC blends and more than 30 out-of-scope refrigerants was not insignificant during the POI. Approximately *** percent of domestic production of in-scope HFC components was used in the production of out-of-scope refrigerant blends during the POI.[41] In-scope HFC components R-32 and R-125 also have stand-alone end uses in addition to being used as components for refrigerants. Specifically, R-32 was approved by the EPA in February 2015 for use in some self-contained air conditioning units.[42] In addition, R-125 has independent uses as a stand-alone refrigerant, in fire suppression systems, as a blanketing gas for aluminum and magnesium casting, and in foam blowing, smelting operations, semiconductor silicon wafer processing, and certain medical applications.[43] The parties agree, however, that no more than *** percent of in-scope HFC components are used as stand-alone products.[44]

Separate Markets. A significant portion of subject HFC components is either captively consumed or swapped between U.S. producers for the production of in-scope HFC blends. However, a merchant market exists for HFC components, as producers sell small volumes of HFC components to each other, to independent HFC blenders such as National, and for use in applications other than the production of in-scope HFC blends.[45] Three domestic integrated producers, Arkema, Chemours, and Honeywell, swap HFC components amongst themselves for use in the production of refrigerant blends.[46] Although the swapping of components subject to these arrangements does not constitute captive production, as that term is ordinarily understood, the swap arrangements constitute something less than a pure merchant market. The small merchant market for HFC components and the integrated producers' swapping arrangements taken together, however, constitute a form of commercial exchange functioning similarly to a merchant market for HFC components. As such, there are separate markets for in-scope HFC blends and in-scope HFC components. Moreover, the markets for HFC blends and HFC components operate differently, with most in-scope HFC blends being sold to distributors/service centers and OEMs, which very seldom purchase HFC components.[47]

Differences in Physical Characteristics and Functions of Upstream and Downstream Articles. There are similarities and differences between HFC components and HFC blends in terms of their physical characteristics and functions. The physical characteristic and functions of HFC components are similar to those of in-scope HFC blends in that the physical properties of

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[41] Calculated from CR/PR at Table I-17. The ratio of the domestic industry's production of out-of-scope blends using in-scope HFC components to total refrigerant blend production was *** percent in 2013, *** percent in 2014, and *** percent in 2015. CR/PR at Table I-17.

[42] CR at II-1 to II-2, PR at II-1.

[43] CR/PR at Table I-7 and at II-1.

[44] *See* Petitioners Prehearing Brief at 12; National Posthearing Brief at 8.

[45] HFC component producers' commercial U.S. shipments accounted for *** percent of the industry's total shipments in 2015. CR/PR at Table III-14.

[46] *See* CR at III-11 to III-12 and n.9, PR at III-6 and n.9.

[47] *See* CR/PR at Tables I-4 and V-13.

any particular HFC blend are determined by the physical properties of its constituent HFC components and other components.[48] These physical properties also determine the HFC blends' end use applications. However, HFC components are used, in most cases, as intermediate products because such components are hazardous and, for two of the components, flammable (R-32 and R-143a).[49] Accordingly, HFC components must be mixed together in prescribed ratios to make non-toxic, non-flammable HFC blends suitable for use as refrigerants in air conditioning and refrigeration applications.[50] Thus, there are some significant differences in the physical characteristics of the upstream and downstream products. Additionally, as discussed above, in-scope HFC components can have end uses independent of in-scope HFC blend production, such as those described for R-32 and R-125, as well as being components for the production of out-of-scope refrigerant blends.[51]

Differences in Value. During the POI, the ratio of the average unit value of the U.S. industry's U.S. commercial shipments of subject HFC components to the average unit value of HFC blends ranged from *** percent to *** percent.[52] Based on reported financial data, the value added by blending operations of the integrated domestic producers ranged from *** percent to *** percent during the POI, while the value added by National's blending operations ranged from *** to *** percent during the period.[53]

Extent of Processes Used to Transform HFC Components into HFC Blends. Each HFC component requires a separate manufacturing facility. At least two HFC components are needed to produce an in-scope HFC blend. No HFC component producer in the United States manufactured all four of the HFC components (in-scope components R-32, R-125, R-143a, and out-of-scope component R-134a) necessary to produce all five in-scope HFC blends. To obtain all of the HFC components necessary for production of an in-scope HFC blend, the three HFC component producers (Arkema, Chemours, and Honeywell)[54] in the United States engage in swapping arrangements amongst themselves.[55]

The processes to transform HFC components into HFC blends are not insubstantial. The blending process is not as capital intensive as the process to produce HFC components, and an HFC blending facility costs significantly less than an HFC component facility; the investment to produce individual components can be hundreds of millions of dollars, while the cost of constructing a blending facility can range between $1 million and $*** million.[56] Nevertheless, the production of HFC blends involves technical expertise and sophisticated equipment. The total value of the property, plant, and equipment of the five reporting blenders in 2015 was

[48] *See generally* CR at I-18 to I-19, PR at I-14 to I-15; *see also* Petitioner Prehearing Brief at 12-13.

[49] CR at I-29, PR at I-21, and CR/PR at Table I-7.

[50] CR at I-16, PR at I-13.

[51] CR/PR at Table I-5.

[52] Calculated from CR/PR at Tables C-2a and C-2b.

[53] CR at VI-21, PR at VI-8.

[54] During the POI, Arkema produced R-32; Chemours produced R-125 until it closed its plant in July 2014; and Honeywell produced R-125 and R-143a. Arkema and Chemours also produced out-of-scope R-134a. CR at III-3 to III-4, PR at III-2 to III-3.

[55] CR at III-3 to III-4. PR at III-2 to III-3.

[56] CR at I-21, PR at I-16.

$*** while that for reporting producers of components was $***; the net asset value of blenders exceeded those for producers of components in both 2014 and 2015.[57] In addition to the requisite capital equipment, a blender must have a highly skilled workforce, comply with regulations governing the handling of hazardous materials from multiple governing entities, and have testing facilities to ensure the individual HFC blends and components have the proper composition.[58] Moreover, a higher number of production-related workers were involved in HFC blending operations than in the production of HFC components.[59] On the other hand, the blending process does not involve numerous steps or a chemical reaction.[60]

Conclusion. Although HFC components are predominantly used for the production of HFC blends, the volume of HFC components that is used in the production of out-of-scope blends and in stand-alone applications is not insignificant.[61] There is also a merchant market for HFC components and, when combined with the volume of HFC components that are swapped by the integrated U.S. producers, there are significant commercial exchanges of HFC components in the U.S. market. In addition, although not on a scale comparable to the component producers, domestic blenders have made significant capital investments in their production facilities, and possess a large and skilled workforce. There are also some important distinctions in the physical attributes of the upstream and downstream products. On balance, while we acknowledge that the predominant use of in-scope HFC components is in the production of in-scope HFC blends, we cannot agree with Petitioners that other uses for HFC components are minimal, that meaningful distinctions do not exist between the markets for blends and components, or that the blending process is insignificant in nature. Therefore, we find that in-scope HFC blends and in-scope HFC components constitute separate domestic like products.[62]

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[57] CR/PR at Table VI-8.

[58] National Prehearing Brief at 21 to 25 and Exhibits 2 and 3.

[59] CR/PR at Table III-22.

[60] Petitioners Prehearing Brief at 13-15 and Table 4; Posthearing Brief at 5 and Exhibit 1 at 23-25.

[61] We note that, in this regard, the more complete record that we have compiled in this final phase investigation is considerably different than the record compiled in the preliminary phase of the investigation. *Compare Preliminary Determination*, USITC Pub. 4558 at 8. For this reason, we do not believe that it is appropriate simply to reiterate the findings made in the preliminary determination, as Petitioners advocate.

[62] Given the fact-specific nature of domestic like product analysis and that prior Commission opinions do not have precedential value, we find that the prior investigations that the parties have cited provide extremely limited guidance. In particular, the principal cases that the Petitioners have cited are inapposite. In *Certain Crystalline Silicon Photovoltaic Products from China and Taiwan*, Inv. Nos. 701-TA-511 and 731-TA-1246-1247 (Final), USITC Pub. 4519 at 13 (Feb. 2015) and *Carbazole Violet Pigment 23 From China and India*, Inv. Nos. 701-TA-437 and 731-TA-1060 and 1061 (Final), USITC Pub. 3744 at 6 (Dec. 2004), the upstream product was used exclusively to produce the in-scope downstream product, which is not the case here. In *Artists' Canvas from China*, Inv. No. 731-TA-1091 (Final), USITC Pub. 3853 at 6 (May 2006), to the extent that the upstream product was sold without further processing, it was sold to the same end users for the same applications as the downstream product, which is also not the case here.

III. Domestic Industry and Related Parties

A. Legal Standards

The statute defines the relevant industry as the "producers as a {w}hole of a domestic like product, or those producers whose collective output of a domestic like product constitutes a major proportion of the total domestic production of the product."[63] In determining the domestic industry, the Commission's general practice has been to include in the industry producers of all domestic production of the like product, whether toll-produced, captively consumed, or sold in the domestic merchant market.

We must determine whether any U.S. producer should be excluded from either of the domestic industries pursuant to section 771(4)(B) of the Tariff Act. This provision allows the Commission, if appropriate circumstances exist, to exclude from a domestic industry producers that are related to an exporter or importer of subject merchandise or which are themselves importers.[64] Exclusion of such a producer is within the Commission's discretion based on the facts presented in each investigation.[65]

B. HFC Blends

Appropriate circumstances do not exist to exclude from the domestic industry the one HFC blends producer that is a related party.[66] Therefore, we define the domestic industry for

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[63] 19 U.S.C. § 1677(4)(A).

[64] *See Torrington Co. v. United States*, 790 F. Supp. 1161, 1168 (Ct. Int'l Trade 1992), *aff'd without opinion*, 991 F.2d 809 (Fed. Cir. 1993); *Sandvik AB v. United States*, 721 F. Supp. 1322, 1331-32 (Ct. Int'l Trade 1989), *aff'd mem*., 904 F.2d 46 (Fed. Cir. 1990); *Empire Plow Co. v. United States*, 675 F. Supp. 1348, 1352 (Ct. Int'l Trade 1987).

[65] The primary factors the Commission has examined in deciding whether appropriate circumstances exist to exclude a related party include the following:

(1) the percentage of domestic production attributable to the importing producer;

(2) the reason the U.S. producer has decided to import the product subject to investigation (whether the firm benefits from the LTFV sales or subsidies or whether the firm must import in order to enable it to continue production and compete in the U.S. market);

(3) whether inclusion or exclusion of the related party will skew the data for the rest of the industry;

(4) the ratio of import shipments to U.S. production for the imported product; and

(5) whether the primary interest of the importing producer lies in domestic production or importation. *Changzhou Trina Solar Energy Co. v. USITC*, 100 F. Supp.3d 1314, 1326-31 (Ct. Int'l Trade 2015); see *also Torrington Co. v. United States*, 790 F. Supp. at 1168.

[66] ICOR is a related party with respect to the industry producing HFC blends because it imported *** short tons of subject HFC blends in 2015. CR/PR at Table D-5. ICOR's shipments of domestically produced in-scope HFC blends over the POI were *** short tons in 2013, *** short tons in 2014, and *** short tons in 2015. *Id*. Thus, ICOR produced HFC blends in each year of the POI and imported subject blends from China in only one year. Its importations were very limited, and were less than its total (Continued...)

the purposes of our determination with respect to HFC blends as consisting of all domestic producers of HFC blends.

C. HFC Components

For the purposes of our determination with respect to HFC components, based on our definition of the domestic like product and our analysis of related parties below, we define the domestic industry as all domestic producers of HFC components. The record shows that *** domestic HFC component producers is a related party because *** imported subject HFC components during the POI.[67] We find that appropriate circumstances do not exist to exclude any related party.

*** were the *** domestic producers of HFC components within the scope during the POI, and *** they support the petition.[68] The ratio of *** subject imports of HFC components to domestic component production was *** throughout the POI.[69] The ratio of *** subject imports of HFC components to domestic production was *** in ***, the *** when it engaged in domestic component production.[70] Each U.S. producer, however, reported imports of HFC components from China ***.[71] In light of this, the use of imported HFC components did not distinguish any of the domestic HFC component producers from each other during the POI, much less serve to benefit one of the producers over its competitors.[72]

In light of the facts that all domestic component producers imported subject merchandise and that each related party is a petitioner, we find on balance that appropriate circumstances do not exist to exclude *** from the domestic component industry as related parties.

Consequently, we define the domestic HFC blend industry to include all domestic producers of HFC blends and the domestic HFC component industry to include all domestic producers of HFC components.

(…Continued)
domestic production during the POI. We consequently find that appropriate circumstances do not exist to exclude ICOR from the domestic HFC blends industry. None of the four other domestic HFC blenders (Arkema, Chemours, Honeywell, and National) imported subject blends during the POI. *See* CR/PR at Tables D-1 to D-3, D-5, and D-7.

[67] CR/PR at I-1 and III-1. In addition, *** are related to subject producers and exporters in China, and *** is related to a subject producer in China. CR/PR at Table III-4.

[68] CR/PR at I-1 and Tables III-1 to III-3.

[69] *** ratio of subject component imports to domestic component production was *** percent in 2015, the only year in which Arkema imported components from China. CR/PR at Table D-1. *** ratio decreased from *** percent in 2013 to *** percent in 2015. CR/PR at Table D-3.

[70] *** ratio of subject component imports to domestic component production was *** percent in 2013 and *** percent in 2014. CR/PR at Table D-2.

[71] *See* Importer's Questionnaire Responses of *** at Question II-4.

[72] In this respect, we note that *** incurred its ***, *** had the *** performance in the component industry during the *** and *** operating performance was the best in ***. CR/PR at Table E-1.

IV. Material Injury by Reason of Subject Imports

A. Legal Standards[73]

In the final phase of antidumping and countervailing duty investigations, the Commission determines whether an industry in the United States is materially injured or threatened with material injury by reason of the imports under investigation.[74] In making this determination, the Commission must consider the volume of subject imports, their effect on prices for the domestic like product, and their impact on domestic producers of the domestic like product, but only in the context of U.S. production operations.[75] The statute defines "material injury" as "harm which is not inconsequential, immaterial, or unimportant."[76] In assessing whether the domestic industry is materially injured by reason of subject imports, we consider all relevant economic factors that bear on the state of the industry in the United States.[77] No single factor is dispositive, and all relevant factors are considered "within the context of the business cycle and conditions of competition that are distinctive to the affected industry."[78]

Although the statute requires the Commission to determine whether the domestic industry is "materially injured or threatened with material injury by reason of" unfairly traded imports,[79] it does not define the phrase "by reason of," indicating that this aspect of the injury

[73] Pursuant to section 771(24) of the Tariff Act, imports from a subject country of merchandise corresponding to a domestic like product that account for less than 3 percent of all such merchandise imported into the United States during the most recent 12 months for which data are available preceding the filing of the petition shall be deemed negligible. 19 U.S.C. §§ 1671b(a),1673b(a), 1677(24)(A)(i),1677(24)(B); *see also* 15 C.F.R. § 2013.1 (developing countries for purposes of 19 U.S.C. § 1677(36)). In the most recent 12-month period preceding the filing of the petition for which are available in the record, June 2014 through May 2015, the volume of subject imports from China accounted for *** percent of total U.S. imports of HFC blends and the volume of subject imports from China accounted for *** percent of total U.S. imports of HFC components. CR at IV-16, PR at IV-5. Consequently, the subject imports of HFC blends and HFC component are not negligible.

[74] 19 U.S.C. §§ 1671d(b), 1673d(b). The Trade Preferences Extension Act of 2015, Pub. L. 114-27, amended the provision of the Tariff Act pertaining to Commission determinations of material injury and threat of material injury by reason of subject imports in certain respects. We have applied these amendments in this investigation.

[75] 19 U.S.C. § 1677(7)(B). The Commission "may consider such other economic factors as are relevant to the determination" but shall "identify each {such} factor ... and explain in full its relevance to the determination." 19 U.S.C. § 1677(7)(B).

[76] 19 U.S.C. § 1677(7)(A).

[77] 19 U.S.C. § 1677(7)(C)(iii).

[78] 19 U.S.C. § 1677(7)(C)(iii).

[79] 19 U.S.C. §§ 1671d(a), 1673d(a).

analysis is left to the Commission's reasonable exercise of its discretion.[80] In identifying a causal link, if any, between subject imports and material injury to the domestic industry, the Commission examines the facts of record that relate to the significance of the volume and price effects of the subject imports and any impact of those imports on the condition of the domestic industry. This evaluation under the "by reason of" standard must ensure that subject imports are more than a minimal or tangential cause of injury and that there is a sufficient causal, not merely a temporal, nexus between subject imports and material injury.[81]

In many investigations, there are other economic factors at work, some or all of which may also be having adverse effects on the domestic industry. Such economic factors might include nonsubject imports; changes in technology, demand, or consumer tastes; competition among domestic producers; or management decisions by domestic producers. The legislative history explains that the Commission must examine factors other than subject imports to ensure that it is not attributing injury from other factors to the subject imports, thereby inflating an otherwise tangential cause of injury into one that satisfies the statutory material injury threshold.[82] In performing its examination, however, the Commission need not isolate the injury caused by other factors from injury caused by unfairly traded imports.[83] Nor does the

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[80] *Angus Chemical Co. v. United States*, 140 F.3d 1478, 1484-85 (Fed. Cir. 1998) ("{T}he statute does not 'compel the commissioners' to employ {a particular methodology}."), *aff'g,* 944 F. Supp. 943, 951 (Ct. Int'l Trade 1996).

[81] The Federal Circuit, in addressing the causation standard of the statute, observed that "{a}s long as its effects are not merely incidental, tangential, or trivial, the foreign product sold at less than fair value meets the causation requirement." *Nippon Steel Corp. v. USITC*, 345 F.3d 1379, 1384 (Fed. Cir. 2003). This was further ratified in *Mittal Steel Point Lisas Ltd. v. United States*, 542 F.3d 867, 873 (Fed. Cir. 2008), where the Federal Circuit, quoting *Gerald Metals, Inc. v. United States*, 132 F.3d 716, 722 (Fed. Cir. 1997), stated that "this court requires evidence in the record 'to show that the harm occurred "by reason of" the LTFV imports, not by reason of a minimal or tangential contribution to material harm caused by LTFV goods.'" *See also Nippon Steel Corp. v. United States*, 458 F.3d 1345, 1357 (Fed. Cir. 2006); *Taiwan Semiconductor Industry Ass'n v. USITC*, 266 F.3d 1339, 1345 (Fed. Cir. 2001).

[82] SAA at 851-52 ("{T}he Commission must examine other factors to ensure that it is not attributing injury from other sources to the subject imports."); S. Rep. 96-249 at 75 (1979) (the Commission "will consider information which indicates that harm is caused by factors other than less-than-fair-value imports."); H.R. Rep. 96-317 at 47 (1979) ("in examining the overall injury being experienced by a domestic industry, the ITC will take into account evidence presented to it which demonstrates that the harm attributed by the petitioner to the subsidized or dumped imports is attributable to such other factors;" those factors include "the volume and prices of nonsubsidized imports or imports sold at fair value, contraction in demand or changes in patterns of consumption, trade restrictive practices of and competition between the foreign and domestic producers, developments in technology and the export performance and productivity of the domestic industry"); *accord Mittal Steel*, 542 F.3d at 877.

[83] SAA at 851-52 ("{T}he Commission need not isolate the injury caused by other factors from injury caused by unfair imports."); *Taiwan Semiconductor Industry Ass'n,* 266 F.3d at 1345 ("{T}he Commission need not isolate the injury caused by other factors from injury caused by unfair imports ... . Rather, the Commission must examine other factors to ensure that it is not attributing injury from other sources to the subject imports." (emphasis in original)); *Asociacion de Productores de Salmon y Trucha*

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"by reason of" standard require that unfairly traded imports be the "principal" cause of injury or contemplate that injury from unfairly traded imports be weighed against other factors, such as non-subject imports, which may be contributing to overall injury to an industry.[84] It is clear that the existence of injury caused by other factors does not compel a negative determination.[85]

Assessment of whether material injury to the domestic industry is "by reason of" subject imports "does not require the Commission to address the causation issue in any particular way" as long as "the injury to the domestic industry can reasonably be attributed to the subject imports" and the Commission "ensure{s} that it is not attributing injury from other sources to the subject imports."[86] [87] Indeed, the Federal Circuit has examined and affirmed various Commission methodologies and has disavowed "rigid adherence to a specific formula."[88]

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de Chile AG v. United States, 180 F. Supp. 2d 1360, 1375 (Ct. Int'l Trade 2002) ("{t}he Commission is not required to isolate the effects of subject imports from other factors contributing to injury" or make "bright-line distinctions" between the effects of subject imports and other causes.); *see also Softwood Lumber from Canada*, Inv. Nos. 701-TA-414 and 731-TA-928 (Remand), USITC Pub. 3658 at 100-01 (Dec. 2003) (Commission recognized that "{i}f an alleged other factor is found not to have or threaten to have injurious effects to the domestic industry, *i.e*., it is not an 'other causal factor,' then there is nothing to further examine regarding attribution to injury"), *citing Gerald Metals,* 132 F.3d at 722 (the statute "does not suggest that an importer of LTFV goods can escape countervailing duties by finding some tangential or minor cause unrelated to the LTFV goods that contributed to the harmful effects on domestic market prices.").

[84] S. Rep. 96-249 at 74-75; H.R. Rep. 96-317 at 47.

[85] *See Nippon Steel Corp*., 345 F.3d at 1381 ("an affirmative material-injury determination under the statute requires no more than a substantial-factor showing. That is, the 'dumping' need not be the sole or principal cause of injury.").

[86] *Mittal Steel*, 542 F.3d at 877-78; *see also id.* at 873 ("While the Commission may not enter an affirmative determination unless it finds that a domestic industry is materially injured 'by reason of' subject imports, the Commission is not required to follow a single methodology for making that determination ... {and has} broad discretion with respect to its choice of methodology.") *citing United States Steel Group v. United States*, 96 F.3d 1352, 1362 (Fed. Cir. 1996) and S. Rep. 96-249 at 75.

[87] Commissioners Pinkert and Kieff do not join this paragraph or the following three paragraphs. They point out that the Federal Circuit, in *Bratsk*, 444 F.3d 1369, and *Mittal Steel*, held that the Commission is *required*, in certain circumstances when considering present material injury, to consider a particular issue with respect to the role of nonsubject imports, without reliance upon presumptions or rigid formulas. The Court has not prescribed a specific method of exposition for this consideration. *Mittal Steel* explains as follows:

> What *Bratsk* held is that "where commodity products are at issue and fairly traded, price competitive, non-subject imports are in the market," the Commission would not fulfill its obligation to consider an important aspect of the problem if it failed to consider whether non-subject or non-LTFV imports would have replaced LTFV subject imports during the period of investigation without a continuing benefit to the domestic industry. 444 F.3d at 1369. Under those circumstances, Bratsk requires the Commission to consider whether replacement of the LTFV subject imports might have occurred during the period of investigation, and it requires the Commission to provide an explanation of its conclusion with respect to that factor.

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The Federal Circuit's decisions in *Gerald Metals, Bratsk*, and *Mittal Steel* all involved cases where the relevant "other factor" was the presence in the market of significant volumes of price-competitive nonsubject imports. The Commission interpreted the Federal Circuit's guidance in *Bratsk* as requiring it to apply a particular additional methodology following its finding of material injury in cases involving commodity products and a significant market presence of price-competitive non-subject imports.[89] The additional "replacement/benefit" test looked at whether nonsubject imports might have replaced subject imports without any benefit to the U.S. industry. The Commission applied that specific additional test in subsequent cases, including the *Carbon and Certain Alloy Steel Wire Rod from Trinidad and Tobago* determination that underlies the *Mittal Steel* litigation.

Mittal Steel clarifies that the Commission's interpretation of *Bratsk* was too rigid and makes clear that the Federal Circuit does not require the Commission to apply an additional test nor any one specific methodology; instead, the court requires the Commission to have "evidence in the record" to "show that the harm occurred 'by reason of' the LTFV imports," and requires that the Commission not attribute injury from nonsubject imports or other factors to subject imports.[90] Accordingly, we do not consider ourselves required to apply the replacement/benefit test that was included in Commission opinions subsequent to *Bratsk*.

The progression of *Gerald Metals, Bratsk*, and *Mittal Steel* clarifies that, in cases involving commodity products where price-competitive nonsubject imports are a significant factor in the U.S. market, the Court will require the Commission to give full consideration, with adequate explanation, to non-attribution issues when it performs its causation analysis.[91]

The question of whether the material injury threshold for subject imports is satisfied notwithstanding any injury from other factors is factual, subject to review under the substantial

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(…Continued)
542 F.3d at 878.

[88] *Nucor Corp. v. United States*, 414 F.3d 1331, 1336, 1341 (Fed. Cir. 2005); *see also Mittal Steel*, 542 F.3d at 879 ("*Bratsk* did not read into the antidumping statute a Procrustean formula for determining whether a domestic injury was 'by reason' of subject imports.").

[89] *Mittal Steel*, 542 F.3d at 875-79.

[90] *Mittal Steel*, 542 F.3d at 873 (quoting from *Gerald Metals*, 132 F.3d at 722), 875-79 & n.2 (recognizing the Commission's alternative interpretation of *Bratsk* as a reminder to conduct a non-attribution analysis).

[91] To that end, after the Federal Circuit issued its decision in *Bratsk*, the Commission began to present published information or send out information requests in final phase investigations to producers in nonsubject countries that accounted for substantial shares of U.S. imports of subject merchandise (if, in fact, there were large nonsubject import suppliers). In order to provide a more complete record for the Commission's causation analysis, these requests typically seek information on capacity, production, and shipments of the product under investigation in the major source countries that export to the United States. The Commission plans to continue utilizing published or requested information in final phase investigations in which there are substantial levels of non-subject imports.

evidence standard.[92] Congress has delegated this factual finding to the Commission because of the agency's institutional expertise in resolving injury issues.[93]

B. The HFC Blends Industry is Materially Injured by Reason of Subject Imports

1. Conditions of Competition and the Business Cycle

The following conditions of competition inform our analysis of whether there is material injury or threat of material injury by reason of subject imports of HFC blends.

a. Demand Conditions

Demand for HFC blends in the United States depends on the demand for their use in downstream products. Residential air conditioning is reported to be the largest end use, followed by commercial refrigeration. Other end uses include commercial air conditioning, transport refrigeration, and process refrigeration.[94] Of the five in-scope HFC blends, R-410A has the largest presence in the U.S. market.[95]

HFC blends were developed to replace HCFCs (hydrochlorofluorocarbons, such as R-22) in air conditioning and refrigeration applications. Consequently, the need to replace HCFCs can drive demand for HFC blends both in new equipment and in existing equipment retrofitted to accept HFC blends.[96] R-22 remains in the refrigerant market, but primarily for use in existing equipment originally designed for the R-22 blend.[97] Future U.S. demand for HFC blends may be reduced by the development of hydrofluoroolefins ("HFOs") and HFO blends. HFOs are commonly considered the "next generation" of refrigerant. The HFC blend industry is developing HFOs to meet regulatory mandates to lower the global warming potential of refrigerant gases and eventually to replace subject HFC blends in some applications, although these refrigerants are not yet significant factors in the U.S. market.[98]

The majority of U.S. producers and importers reported that the U.S. market was subject to business cycles. All companies reported that HFC blend demand is seasonal with the most demand occurring directly before the summer months. Demand for certain blends used in refrigeration products reportedly are sold steadily throughout the year although some blends

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[92] We provide in our discussion below a full analysis of other factors alleged to have caused any material injury experienced by the domestic industry.

[93] *Mittal Steel*, 542 F.3d at 873; *Nippon Steel Corp*., 458 F.3d at 1350, *citing U.S. Steel Group*, 96 F.3d at 1357; S. Rep. 96-249 at 75 ("The determination of the ITC with respect to causation is ... complex and difficult, and is a matter for the judgment of the ITC.").

[94] CR at II-14, PR at II-9; and CR/PR at Table II-3.

[95] R-410A accounted for a majority of both domestic production of in-scope HFC blends and subject imports of HFC blends during the POI. CR/PR at Tables III-10 and IV-4.

[96] CR at II-16 to II-17, PR at II-10.

[97] CR at I-20 to I-21, PR at I-15.

[98] CR at I-46 and II-20, PR at I-30 and II-13.

are used more in the first eight months of the year when demand increases for air conditioning units.[99]

Apparent U.S. consumption of HFC blends rose from *** short tons in 2013 to *** short tons in 2014, and then to *** short tons in 2015. This was a *** percent increase from 2013 to 2015.[100]

b. Supply Conditions

The U.S. market for HFC blends was satisfied almost entirely by the domestic industry and subject imports during the POI, with nonsubject imports accounting for a very small portion of the market. Prior to the POI, all five HFC blends covered by the scope of this investigation were subject to patents held by the Petitioners. By 2011, all patent protection for these HFC blends had expired, thus enabling any HFC producer to manufacture the in-scope HFC blends without license.[101]

The domestic industry's share of the U.S. market for HFC blends decreased throughout the POI, from *** percent in 2013 to *** percent in 2014, and to *** percent in 2015.[102] There were five domestic producers of HFC blends during the POI. Three of these firms (Arkema, Chemours, and Honeywell) are integrated producers that produced both components and blends, while another firm (National) is an independent blender and the fifth firm (ICOR) is a blender/reclaimer that produced only a small amount of HFC blends during the POI. The domestic industry's capacity to produce HFC blends rose moderately over the POI, from *** short tons in 2013 to *** short tons in 2014, before decreasing to *** short tons in 2015.[103] The domestic industry exported a significant portion of its HFC blend production, although its exports of HFC blends decreased over the POI.[104]

Subject imports' share of the U.S. HFC blends market increased from *** percent in 2013 to *** percent in 2014 and *** percent in 2015.[105]

Nonsubject imports of HFC blends had a very small and diminishing presence in the U.S. market during the POI. Their share of apparent U.S. consumption of HFC blends decreased from *** percent in 2013, to *** percent in 2014, and there were no nonsubject imports in 2015.[106] The largest nonsubject source of HFC blends during the POI was ***.[107]

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[99] CR at II-16, PR at II-9, and CR/PR at Table II-4.

[100] CR/PR at Table C-2b.

[101] CR II-17, at PR at II-11; *see also* National Prehearing Brief at 38 and 45.

[102] CR/PR at Table C-2b.

[103] CR/PR at Table III-10.

[104] Domestic producers' exports of HFC blends, as a percentage of total shipments, increased from *** percent in 2013 to *** percent in 2014, before decreasing to *** percent in 2015. CR at II-6, PR at II-4.

[105] CR/PR at Table C-2b.

[106] CR/PR at Table C-2b.

[107] CR at II-13, PR at II-8.

c. Substitutability and Other Conditions

We find that there is a high degree of substitutability between the domestic like product and subject imports. All responding U.S. producers and the majority of importers reported that domestically produced HFC blends, subject imports, and nonsubject imports of HFC blends are "always" or "frequently" interchangeable.[108] When asked about the significance of differences other than price between domestically produced HFC blends and subject imports, most reporting U.S. producers and importers indicated that such differences were only "sometimes" or "never" significant.[109] Purchasers most frequently cited price as the most important of their top-three purchasing factors, and a majority of purchasers also reported that price is very important in purchasing decisions.[110] In light of this, we find that the record indicates that price is an important factor in purchasing decisions, although quality and the availability of supply can also be important factors.[111]

The primary raw materials used to produce the subject HFC blends are the in-scope HFC components (R-32, R-125, and R-143a) and out-of-scope component R-134a.[112] There was a reported shortage of R-125 prior to the POI due to a commensurate shortage of hydrofluoric acid, one of the principal raw materials used to produce R-125.[113] Also, *** and *** reported closing facilities during the POI that produced R-125.[114] R-125 is the only in-scope HFC component used in all five in-scope blends and is currently produced by only one U.S. producer, Honeywell.[115] Components (in-scope HFC components and R-134a) account for the bulk of the cost of producing the in-scope HFC blends. Components as a share of the total cost of finished HFC blends ranged from *** percent to *** percent over the POI.[116]

2. Volume of Subject Imports

Section 771(7)(C)(i) of the Tariff Act provides that the "Commission shall consider whether the volume of imports of the merchandise, or any increase in that volume, either in absolute terms or relative to production or consumption in the United States, is significant."[117]

The volume of subject imports of HFC blends was *** short tons in 2013, *** short tons in 2014, and *** short tons in 2015.[118] The market share of subject imports increased steadily

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[108] CR at II-28, PR at II-18, and CR/PR at Table II-13.

[109] CR at II-29 to II-30, PR at II-19 to II-20, and CR/PR at Table II-15.

[110] CR/PR at Tables II-9b and II-10.

[111] *See* CR/PR at Table II-9b.

[112] CR/PR at V-1.

[113] See National Prehearing Brief at 50-52 and Chinese Respondents Prehearing Brief at 16.

[114] CR at III-3 and nn.6 & 7, PR at III-2 and nn.6 & 7, and CR/PR at Table III-5.

[115] CR at III-8, PR at III-4 to III-5. Chemours ceased R-125 production when it closed its facility in July 2014. CR at III-3 and n.7, PR at III-2 and n.7.

[116] CR/PR at Table VI-5.

[117] 19 U.S.C. § 1677(7)(C)(i).

[118] CR/PR at Table IV-4. The volume of U.S. importers' shipments of subject imports of HFC blends was somewhat different from the volume of subject imports due to fluctuations in U.S. importer (Continued...)

over the POI; it was *** percent in 2013, *** percent in 2014, and *** percent in 2015. The increase of subject imports' market share came almost entirely at the expense of the domestic industry. As subject imports gained *** percentage points of market share over the POI, the domestic industry lost *** percentage points and nonsubject imports lost *** percentage points of market share.[119]

We conclude that the subject import volume and the increase in that volume is significant in absolute terms and relative to apparent U.S. consumption.

3. Price Effects of Subject Imports

Section 771(7)(C)(ii) of the Tariff Act provides that, in evaluating the price effects of the subject imports, the Commission shall consider whether

> (I) there has been significant price underselling by the imported merchandise as compared with the price of domestic like products of the United States, and
>
> (II) the effect of imports of such merchandise otherwise depresses prices to a significant degree or prevents price increases, which otherwise would have occurred, to a significant degree.[120]

As addressed in section IV.B.1.c above, the record indicates there is a high degree of substitutability between subject imports and the domestic like product and that price, along with availability and reliability of supply to a lesser degree, is an important consideration for purchasers choosing among competing HFC blend suppliers.

In the final phase of this investigation, the Commission collected pricing data for four HFC blend products.[121] Five domestic producers and nine importers provided usable quarterly

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(…Continued)
inventories, particularly in 2015. CR/PR at Table VII-8. U.S. shipments of subject imports increased from *** short tons in 2013 to *** short tons in 2014 to *** short tons in 2015, an increase of *** percent over the POI. CR/PR at Table C-2b.

[119] CR/PR at Table C-2b. We do not agree with National that the expiration of U.S. patents on the five in-scope HFC blends between *** can explain the sharp increase in subject import volumes during the POI. National Prehearing Brief at 45-46 and Exhibit 7. The last U.S. patent on an in-scope HFC blend expired in ***, two years before the beginning of the POI, yet the increase in subject blend import volume and market penetration occurred throughout the period. *See* CR/PR at Tables III-12 and C-2b.

[120] 19 U.S.C. § 1677(7)(C)(ii).

[121] These are: Product 1 - R-410A in bulk containers (1,000 lbs. or greater); Product 2 - R-410A in 25 lb. disposable tanks or cylinders; Product 3 - R-404A in 24 lb. disposable tanks or cylinders; and Product 4 - R-407C in 25 lb. disposable tanks or cylinders. The Commission collected data on both sales and direct imports of the pricing products; sales price information constituted the bulk of the data for imports of the four HFC blend products. *See* CR at V-6 to V-7, PR at V-4 to V-5, and CR/PR at Tables V-5 to V-8.

selling price data and direct import purchase cost data for these products.[122] Pricing data from these firms accounted for approximately 80.1 percent of U.S. producers' commercial shipments of HFC blends and nearly all U.S. commercial shipments of subject HFC blends from China in 2015.

The pricing data indicate that subject imports pervasively undersold the domestic like product throughout the POI. Specifically, subject imports undersold the domestic like product in 42 of 48 quarterly comparisons at margins ranging from *** to *** percent.[123] The quantity of subject imports in underselling comparisons was *** pounds, while the quantity of subject imports that oversold the domestic like product was *** pounds.[124] The direct import purchase cost data also show that subject imports were consistently priced below the domestic like product and often by significant margins.[125] Given the predominant underselling and the fact that price is an important consideration in purchasing decisions, we find the underselling by subject imports of HFC blends to be significant. Purchasers also confirmed shifting from the domestic like product to subject imports due to their lower price, which further supports a finding that this underselling was significant.[126]

In our analysis of price trends, we have relied principally on price data collected through the second quarter of 2015, given the increases in domestic prices that occurred after the filing of the petition.[127] During the period between the first quarter of 2013 and the second quarter of 2015, prices for each of the four domestically produced HFC blend pricing products (Products 1, 2, 3, and 4) declined by *** to *** percent. Sales prices for three of the four imported HFC blend pricing products (Products 2, 3, and 4) also declined during this period.[128] The price declines occurred despite increasing apparent consumption,[129] and cannot be explained by changes in raw materials costs.[130] Moreover, five responding purchasers reported that U.S.

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[122] CR at V-7, PR at V-5, and CR/PR at Tables V-5 to V-8.

[123] CR at V-23, PR at V-9, and CR/PR at Table V-12.

[124] CR at V-23, PR at V-9, and CR/PR at Table V-12.

[125] CR/PR at Tables V-5 to V-8.

[126] In response to the Commission's purchaser's questionnaires, 7 of 20 responding purchasers reported they had shifted purchases of HFC blends from U.S. producers to subject imports during the POI. CR at V-26, PR at V-10, and CR/PR at Table V-14. Five of these purchasers reported that subject import prices were lower and that price was the primary reason for the shift to subject imports. Purchasers reported shifting a total of *** short tons of HFC blend purchases from the domestic like product to subject imports. CR/PR at Tables V-14 and 15b.

[127] *See* CR at VI-22 to VI-23 nn.37 and 38, PR at VI-9 nn.37 and 38 (indicating domestic producers increased prices after petition filing) and CR/PR at Tables V-5 to V-8 (confirming that prices for three of four domestically produced HFC blends products increased from the second to fourth quarters of 2015 and were also higher in the fourth quarter of 2015 than the first quarter of 2015).

[128] CR/PR at Tables V-5 to V-8. Even when data for the entire POI are considered, prices for three of the four domestically produced blends declined between the first quarter of 2013 and the fourth quarter of 2015. *Id*.

[129] *See* CR/PR at Table C-2b.

[130] Raw materials costs for HFC blends (in other words, the cost of components used to produce the blends) decreased $*** per short ton from 2013 to 2014, while the average unit value of the domestic industry's commercial sales decreased $*** per short ton over the same period. Due to the (Continued...)

producers had reduced prices to compete with lower priced imports from China, with price reductions ranging from 10 to 50 percent.[131] We therefore conclude that subject imports depressed prices for the domestic like product to a significant degree.[132]

The pervasive underselling by subject imports of HFC blends enabled those imports to capture market share from the domestic industry. Moreover, the increasing volume of low-priced subject imports significantly depressed the domestic industry's prices. We consequently conclude that the subject imports had significant price effects.

4. Impact of Subject Imports[133]

Section 771(7)(C)(iii) of the Tariff Act provides that examining the impact of subject imports, the Commission "shall evaluate all relevant economic factors which have a bearing on the state of the industry."[134] These factors include output, sales, inventories, capacity

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price increases that occurred after filing the petition, the domestic industry was able to increase its average unit sales values for HFC blends after the second quarter of 2015, notwithstanding a continuing decline in raw materials prices. Calculated from CR/PR at Table VI-5; *see also* Chinese Respondents Prehearing Brief at 34; Posthearing Brief at 13. Consequently, the available data indicate that prices for HFC blends did not merely track raw materials costs during the POI.

[131] CR at V-28, PR at V-10 to V-11, and CR/PR at Table V-15b (of the 17 responding purchasers, five reported that U.S. producers had lowered prices to compete with subject import prices, two responded that U.S. producers had not lowered prices, and 10 reported they did not know).

[132] Chinese Respondents argue that prices for HFC blends were artificially inflated prior to the POI due to a shortage of R-125. They claim that the shortage caused higher prices for HFC blends early in the POI due to a "hangover" effect. They further claim that the subsequent easing of the R-125 shortage caused prices for HFC blends to decrease over the POI to normal levels. Chinese Respondents Prehearing Brief at 34; Posthearing Brief at 13; *see also* National Posthearing Brief, Appendix at A-1. We observe, however, that R-125 prices fluctuated during the POI and, even to the extent a pre-POI R-125 shortage had effects during the POI, these effects could not explain the magnitude of the domestic price declines experienced during the POI. CR/PR at Tables V-10 and V-11. Moreover, *** stated that input prices for components, including R-125, remained generally stable between 2013 and 2015. CR at VI-21 and n.35, PR at VI-8 and n.35.

[133] The statute instructs the Commission to consider the "magnitude of the dumping margin" in an antidumping proceeding as part of its consideration of the impact of imports. 19 U.S.C. § 1677(7)(C)(iii)(V). We have considered the magnitude of the dumping margins found by Commerce. In its final dumping determination, Commerce found dumping margins of 101.82 percent for the investigated producer/exporter combinations and of 216.37 percent for the PRC-Wide Entity. *Commerce Final Determination*, 81 Fed. Reg. at 42316. Commerce calculated these margins based on a class or kind of merchandise that was defined more broadly than HFC blends. While we have considered the magnitude of the margins, in light of the fact they concern a broader category of merchandise than the domestic like product that we have defined, we have given principal weight to other statutory factors in our impact analysis.

[134] 19 U.S.C. § 1677(7)(C)(iii); *see also* SAA at 851 and 885 ("In material injury determinations, the Commission considers, in addition to imports, other factors that may be contributing to overall (Continued...)

utilization, market share, employment, wages, productivity, gross profits, net profits, operating profits, cash flow, return on investment, return on capital, ability to raise capital, ability to service debts, research and development, and factors affecting domestic prices. No single factor is dispositive and all relevant factors are considered "within the context of the business cycle and conditions of competition that are distinctive to the affected industry."[135]

We find that the domestic industry's performance was impaired during the POI as it lost market share to subject imports. Any growth in output-related indicators was far less than that of apparent U.S consumption. Similarly, the industry's financial condition was poor as the industry could not fully benefit from improvements in apparent U.S. consumption and its cost structure.

The domestic industry's capacity and capacity utilization increased slightly from 2013 to 2015.[136] Its production declined from 2014 to 2015 and increased at a far more modest rate than apparent consumption from 2013 to 2015.[137] The domestic industry's U.S. commercial shipments showed a similar trend to production, increasing from *** short tons in 2013 to *** short tons in 2014, and then declining to *** short tons in 2015, an increase of *** percent from 2013 to 2015. The domestic industry's share of apparent U.S. consumption steadily declined over the POI from *** percent in 2013 to *** percent in 2014, and then to *** percent in 2015.[138] The industry's end-of-period inventories substantially increased over the period.[139]

The domestic industry's employment and productivity declined between 2013 and 2015. The average number of production-related workers increased from 2013 to 2014, but then declined in 2015 and was lower in 2015 than in 2013.[140] The industry's productivity decreased

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injury. While these factors, in some cases, may account for the injury to the domestic industry, they also may demonstrate that an industry is facing difficulties from a variety of sources and is vulnerable to dumped or subsidized imports.").

[135] 19 U.S.C. § 1677(7)(C)(iii). This provision was amended by the Trade Preferences Extension Act of 2015, Pub. L. 114-27.

[136] The domestic industry's production capacity for HFC blends was *** short tons in 2013 and 2014, and *** short tons in 2015. CR/PR at Table III-10. The domestic industry's capacity utilization was *** percent in 2013, *** percent in 2014, and *** percent in 2015. *Id*.

[137] The domestic industry's production was *** short tons in 2013, *** short tons in 2014, and *** short tons in 2015. CR/PR at Table III-10. The increase in production from 2013 to 2015 was *** percent, while during that period apparent U.S. consumption increased *** percent. CR/PR at Table C-2b.

[138] CR/PR at Table C-2b.

[139] The domestic industry's end-of-period inventories were *** short tons in 2013, *** short tons in 2014, and *** short tons in 2015. CR/PR at Table III-20.

[140] The domestic industry's average number of production-related workers was *** in 2013, *** in 2014, and *** in 2015. CR/PR at Table III-22

irregularly over the POI,[141] while its unit labor costs increased irregularly.[142] The domestic industry's hours worked, wages paid, and hourly wages also increased irregularly.[143]

The domestic industry's financial performance fluctuated, but was generally poor. Despite the increases in apparent U.S. consumption, its quantity of net sales was lower in 2015 than in 2013. Net sales revenues declined during each year of the POI, reflecting in part the significant price depression caused by the subject imports.[144] Despite the fact that the cost of goods sold declined each year of the POI on a unit basis and from 2013 to 2015 on an aggregate basis,[145] gross profits fluctuated and were lower in 2015 than in 2013.[146] Operating income and net income, by contrast, showed some improvement between 2013 and 2015.[147] The industry, however, never obtained more than *** profitability, as the ratio of operating income was *** percent in 2013, *** percent in 2014, and *** percent in 2015.[148] The industry's capital expenditures increased over the POI,[149] while its research and development ("R&D") expenses steadily declined.[150]

Some of the improvement in the domestic industry's financial condition in 2015 was attributable to decreases in costs and post-petition increases in domestic prices. Nevertheless, because of the significant and increased volume of subject imports, the domestic industry lost market share and was unable to benefit fully from increased demand. Lower priced subject imports took market share and drove down domestic prices which resulted in the domestic industry foregoing revenues that it otherwise would have received. Consequently, the domestic industry's financial condition was worse than it would have been otherwise. We therefore find that the subject imports had a significant impact on the domestic industry.

We have considered whether there are other factors that have had an impact on the domestic industry so as not to attribute any injury caused by these factors to the subject imports. As indicated above, nonsubject imports were a small and declining factor in the U.S.

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[141] The domestic industry's productivity (in short tons per hour) was *** in 2013, *** in 2014, and *** in 2015. CR/PR at III-22.

[142] The domestic industry's unit labor costs were $*** in 2013, $*** in 2014, and $*** in 2015. CR/PR at Table III-22.

[143] Hours worked were *** in 2013, *** in 2014, and *** in 2015. Wages paid were $*** in 2013, $*** in 2014, and $*** in 2015. Hourly wages paid were $*** in 2013, $*** in 2014, and $*** in 2015. CR/PR at Table III-22.

[144] The domestic industry's total net sales values were $*** in 2013, $*** in 2014, and $*** in 2015. CR/PR at Table IV-5.

[145] CR/PR at Table VI-5.

[146] The domestic industry's gross profit was $*** in 2013, $*** in 2014, and $*** in 2015. CR/PR at Table IV-5.

[147] The domestic industry's net income was *** in 2013, *** in 2014, and $*** in 2015. Its operating income was $*** in 2013, *** in 2014, and $*** in 2015. CR/PR at Table VI-5.

[148] CR/PR at Table VI-5.

[149] The industry's capital expenditures were $*** in 2013, $*** in 2014, and $*** in 2015. CR/PR at Table VI-7.

[150] The industry's R&D expenses were $*** in 2013, $*** in 2014, and $*** in 2015. CR/PR at Table VI-7.

market over the POI.[151] Nonsubject imports as a share of apparent U.S. consumption decreased from *** percent in 2013 to *** percent in 2014, and then to *** percent in 2015.[152] Consequently, nonsubject imports cannot explain the domestic industry's loss of market share and revenues. Other factors cited by respondents also cannot explain the loss in market share, output, and revenues that we have attributed to subject imports of HFC blends.[153]

For the reasons stated above, we determine that an industry in the United States is materially injured by reason of subject imports of HFC blends from China that are sold in the United States at less than fair value.

5. Critical Circumstances

In the final dumping determination concerning subject imports from China, Commerce made affirmative critical circumstances determinations with respect to certain exporters.[154] Because we have determined that the domestic HFC blends industry is materially injured by reason of subject imports, we must further determine "whether the imports subject to the affirmative {Commerce critical circumstances} determination . . . are likely to undermine seriously the remedial effect of the antidumping order to be issued."[155] We do this only with respect to those imports which are the subject of our affirmative determination of material injury by reason of subject imports.[156]

The SAA indicates that the Commission is to determine "whether, by massively increasing imports prior to the effective date of relief, the importers have seriously undermined the remedial effect of the order" and specifically "whether the surge in imports prior to the

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[151] CR/PR at Table C-2b.

[152] CR/PR at Table C-2b.

[153] *** reported that the U.S. Environmental Protection Agency's (EPA) April 3, 2013 ruling on the increased allocation of R-22 greatly decreased the demand for HFC blends and components during the POI. It claimed that the EPA ruling increased the supply of R-22 that, in turn, made R-22 more cost effective than HFC blends. We observe that, although the EPA increased limits on R-22, the record does not support the proposition that demand for HFC blends declined significantly as a result. As previously indicated, apparent consumption of HFC blends rose during each year of the POI. CR/PR at Table C-2-b. Petitioners contend that substitution for HFC blends and R-22 is limited given the large disparity between prices of these products. CR at II-16 and n.30, PR at II-10 and n.30. This is supported by other material in the record indicating that costly modifications are needed to allow air conditioning and refrigeration equipment that use HFC blends to substitute R-22. *See* Petitioners Posthearing Brief at 2 and Exhibit 1 at 11-12; Hearing Transcript at 100 (Sassano). Indeed, market participants indicated that there were limited substitutes for in-scope HFC blends and named R-22 as a substitute for only one of the five in-scope HFC blends. CR/PR at Table II-6.

[154] *Commerce Final Determination*, 81 Fed. Reg. at 42315.

[155] 19 U.S.C. §§ 1671d(b)(4)(A)(i), 1673d(b)(4)(A)(i); 19 U.S.C. §§ 1671d(b)(4)(A)(ii), 1673d(b)(4)(A)(ii); 19 U.S.C. §§ 1671d(e)(2), 1673d(e)(2).

[156] *See* 19 U.S.C. § 1673d(b)(4)(A) (Commission critical circumstances analysis pertinent to those imports that will be subject to an antidumping duty order); *Collated Roofing Nails from China and Taiwan*, Inv. Nos. 731-TA-757, 759 (Final), USITC Pub. 3070 at 24-25 (Nov. 1997).

suspension of liquidation, rather than the failure to provide retroactive relief, is likely to seriously undermine the remedial effect of the order."[157] The legislative history for the critical circumstances provision indicates that the provision was designed "to deter exporters whose merchandise is subject to an investigation from circumventing the intent of the law by increasing their exports to the United States during the period between initiation of an investigation and a preliminary determination by {Commerce}."[158] An affirmative critical circumstances determination by the Commission, in conjunction with an affirmative determination of material injury by reason of subject imports, would normally result in the retroactive imposition of duties for those imports subject to Commerce's affirmative critical circumstances determination for a period 90 days prior to the suspension of liquidation.[159]

The statute provides that, in making this determination, the Commission shall consider, among other factors it considers relevant –

> (I) the timing and the volume of the imports,
> (II) a rapid increase in inventories of the imports, and
> (III) any other circumstances indicating that the remedial effect of the {order} will be seriously undermined.[160]

In considering the timing and volume of subject imports, the Commission's practice is to consider import quantities prior to the filing of the petition with those subsequent to the filing of the petition using monthly statistics on the record regarding those firms for which Commerce has made an affirmative critical circumstance determination.[161]

a. Parties' Arguments

Petitioners argue that, in making its decision concerning critical circumstances, the Commission should examine a sufficiently long period to capture seasonal changes in volume.[162] They also argue that questionnaire responses show that U.S. inventories of HFC blends from China at the end of 2015 were ***. Petitioners further argue that the inventory stockpile is sufficient in magnitude to depress domestic prices for most of 2016 and to prevent the domestic industry from obtaining the relief intended by the statute.[163]

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[157] SAA at 877.

[158] *ICC Industries, Inc. v. United States*, 812 F.2d 694, 700 (Fed. Cir. 1987), quoting H.R. Rep. No. 317, 96th Cong., 1st Sess. 63 (1979), *aff'g* 632 F. Supp. 36 (Ct. Int'l Trade 1986).

[159] *See* 19 U.S.C. §§ 1671b(e)(2), 1673b(e)(2).

[160] 19 U.S.C. §§ 1671d(b)(4)(A)(ii), 1673d(b)(4)(A)(ii).

[161] *See Lined Paper School Supplies from China, India, and Indonesia*, Inv. Nos. 701-TA-442 to 443, 731-TA-1095 to 1097 (Final), USITC Pub. 3884 at 46-48 (Sept. 2006); *Carbazole Violet Pigment from China and India*, Inv. Nos. 701-TA-437 & 731-TA-1060 to 1061 (Final), USITC Pub. 3744 at 26 (Dec. 2004); *Certain Frozen Fish Fillets from Vietnam*, Inv. No. 731-TA-1012 (Final), USITC Pub. 3617 at 20-22 (Aug. 2003).

[162] Petitioners Prehearing Brief at 57.

[163] Petitioners Prehearing Brief at 59 and Exhibit 6; Posthearing Brief at 14.

National and the Chinese Respondents argue that any increase in subject imports following the filing of the petition does not warrant a finding of critical circumstances.[164] They acknowledge that U.S. importers' inventories of both blends and components, as well as U.S. importers' inventories as a ratio of U.S. imports, U.S. shipments of imports, and total shipments, were *** in 2015 than in 2013 and 2014. They claim, however, that *** of the imports in 2015 occurred in the January-June pre-petition period and thus may reflect imports made before the filing of the petition.[165] They argue that there are no truly massive increases in import volumes accompanied by increases in U.S. inventory levels of subject imports following the filing of the petition. National argues that no record evidence suggests that the post-petition levels of subject imports and inventories would significantly postpone, materially impair, or undermine seriously the remedial effect of any antidumping order.[166]

b. Analysis

On June 24, 2016, Commerce published its final determination in its antidumping duty investigation, finding that critical circumstances exist with respect to certain imports of HFC blends and components from China.[167] Specifically, Commerce found that critical circumstances exist for exporter T.T. International Company and the PRC-wide entity and do not exist for the other six exporters that received firm-specific dumping margins.[168] For the purposes of our analysis, we consider the six months prior to the filing of the petition (January to June 2015) and the six months following the filing of the petition (July to December 2015).[169]

Imports of HFC blends from China that will be subject to an antidumping duty order and are also subject to affirmative critical circumstances findings in Commerce's antidumping duty investigation increased from *** short tons in January to June 2015 to *** short tons in July to December 2015, for an increase of *** percent.[170] U.S. importers' end-of-period inventories of subject HFC blends were higher in 2015, at *** short tons than in 2014, at *** short tons.[171]

We have considered the increase in imports of HFC blends subject to Commerce's critical circumstances findings in the post-petition period in this investigation. Notwithstanding

[164] National Prehearing Brief 83-85; Chinese Respondents Prehearing Brief at 60.

[165] National Prehearing Brief at 85-86.

[166] National Prehearing Brief at 88-91; Posthearing Brief at 14-15; and Chinese Respondents Prehearing Brief at 61.

[167] *Commerce Final Determination*, 81 Fed. Reg. at 42315, and accompanying *Issues and Decision Memorandum*.

[168] *Commerce Final Determination*, 81 Fed. Reg. at 42315, and accompanying *Issues and Decision Memorandum*, Part VII at Comment 7.

[169] Our current practice is to use six-month periods for comparisons of pre-petition and post-petition levels of subject imports, unless Commerce made a preliminary determination within the six-month post-petition period or other special circumstances exist. *See Certain Corrosion-Resistant Steel Products from China, India, Italy, Korea, and Taiwan*, Inv. Nos. 701-TA-534-537, 731-TA-1274-1278 (Final), USITC Pub. 4620 at 35-36 (July 2016). We use six-month periods here.

[170] CR/PR at Table IV-10.

[171] CR/PR at Table VII-8.

the increase in subject imports of HFC blends and the apparent increase in U.S. importer's end-of-period inventories following the filing of the petition, we do not find evidence of a massive increase in subject imports of HFC blends from China that would warrant retroactive application of the suspension of liquidation -- and imposition of duties – for a 90-day period. Although the percentage increase in subject imports is not insubstantial, the increase is more modest on an absolute basis. The volume increased by *** short tons, while apparent U.S. consumption was *** short tons in 2015. To the extent that end-of-period inventories of subject imports of HFC blends held by U.S. importers increased after the filing of the petition, this increase appears to be a function of a new market entrant, ***, which was establishing inventories so it could engage in operations rather than stockpiling HFC blends in response to the filing of the petition.[172] Moreover, the available data likely overstates the increase in inventories because it is not limited to the subject companies for which Commerce made affirmative critical circumstances findings.[173] In addition, Petitioners stated at the hearing that the domestic industry was experiencing higher prices and higher profits even before the preliminary duties were imposed.[174] Indeed, we found above that prices for domestically produced HFC blends rose after the filing of the petition, contradicting Petitioners' argument that inventory stockpiles are sufficient to continue to depress those prices. Consequently, we determine that critical circumstances do not exist with respect to subject imports of HFC blends from China.

C. The HFC Components Industry is Not Materially Injured by Reason of Subject Imports[175]

1. Conditions of Competition

Several conditions of competition inform our analysis of whether there is material injury or threat of material injury by reason of subject imports of HFC components.[176]

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[172] CR/PR at Table IV-1; *see also* *** U.S. Importer Questionnaire Response; e-mail from *** to Joanna Lo, EDIS Doc. 582541.

[173] Petitioners argue that the Commission should use an alternative data source, Datamyne, in making its determination concerning critical circumstances and to analyze the volume of subject imports for the 6-month periods preceding and postdating the filing of the petition. Petitioners Prehearing Brief at 58 and Exhibit 5; *see also* National Posthearing Brief at 14 to 15 and Appendix. The data suggested by Petitioners contains information for imports for both subject HFC blends and HFC components, so it is of limited utility for the purpose of determining whether critical circumstances exist with respect to subject HFC blends from specific subject producers. Moreover, the Petitioners did not provide supporting documentation for these data, so there was no way to verify their accuracy or possibly adjust them based on the separate like product definitions.

[174] *See* Hearing Transcript at 43 (Bachman) (domestic industry improved price levels and revenues before preliminary duties were imposed).

[175] The pertinent legal standards are discussed in section III.B above.

[176] The domestic component industry captively consumes the majority of its production of the domestic like product in the manufacture of downstream articles. Accordingly, we have considered (Continued...)

a. Demand Conditions

As discussed above, demand for HFC blends in the United States depends on the demand for its use in downstream products. Demand for HFC components, in turn, is primarily driven by the demand for in-scope HFC blends, although HFC components are also used in the production of more than 30 out-of-scope refrigerants. HFC components also have some independent uses, such as stand-alone refrigerants, in fire suppression systems, as a blanketing gas for aluminum and magnesium casting, and in foam blowing, smelting operations, semiconductor silicon wafer processing, and certain medical applications.[177]

Apparent U.S. merchant market consumption of HFC components decreased from *** short tons in 2013 to *** short tons in 2014, and then increased to *** short tons in 2015, an increase of *** percent from 2013 to 2015.[178]

(…Continued)
whether the statutory captive production provision requires us to focus our analysis primarily on the merchant market when assessing market share and the factors affecting the financial performance of the domestic industry. *See* 19 U.S.C. § 1677(7)(C)(iv). No party briefed this issue.

We determine that the threshold criteria for application of the captive production provision have been met because significant production has been internally transferred and significant production has been sold on the merchant market. The record indicates that commercial shipments of HFC components accounted for *** percent of domestic producers' total shipments of HFC components (excluding swaps), and internal consumption accounted for *** percent in 2015. CR/PR at Table III-14.

We also determine that the first statutory criterion has been met. This criterion focuses on whether any of the domestic like product that is transferred internally for further processing is in fact sold on the merchant market. There is no information in the record indicating that HFC components that are internally transferred for processing into downstream blends enter the merchant market for HFC components.

In applying the second statutory criterion, we generally consider whether the domestic like product is the predominant material input to a downstream product by referring to its share of the raw material costs of the downstream product. The record indicates that the cost of HFC components accounted for between *** and *** percent of the net sales value of HFC blends during the POI. CR/PR at Table VI-5. While this may overstate somewhat the contribution of the domestic like product because it would also include the cost of R-134a, we observe that R-134a is not used to produce R-410a, the HFC blend that accounts for the *** of domestic production of in-scope blends. CR/PR at Tables I-25 and III-10. Therefore, we find that the second statutory criterion has been met.

Consequently, we find that each statutory criterion is satisfied and the captive market provision is applicable for HFC components in this investigation. Accordingly, we will focus primarily on the merchant market for HFC components in analyzing the market share and financial performance of the domestic HFC component industry.

[177] CR/PR at Tables I-7 and II-1.

[178] CR/PR at Table C-2a.

b. Supply Conditions

Sources of supply to the U.S. market during the POI included the domestic industry, subject imports, and imports from nonsubject sources. The U.S. market for HFC components was satisfied almost entirely by the domestic industry and subject imports during the POI.

There were three domestic producers of HFC components during the POI. These firms (Arkema, Chemours, and Honeywell) are integrated producers that produced both HFC components and HFC blends. At least two HFC components are needed to produce any of the HFC blends within the scope.[179] None of the three producers in the United States manufactures all four of the HFC components, including out-of-scope R-134a, that are necessary to produce the five HFC blends within the scope.[180] As a result, each of the three producers engaged in swap arrangements among themselves to acquire additional HFC components that they do not produce. These swap arrangements include R-134a, which is not included in the scope of this investigation, because R-134a is used as a component in the production of three of the five in-scope HFC blends.[181] Additionally, all three integrated producers, as well as the independent blenders, imported or purchased the HFC components necessary to produce HFC blends.[182] Most subject imports of HFC components were purchased by domestic producers of HFC blends, including the integrated producers.[183]

The domestic industry's share of the U.S. component merchant market increased throughout the POI, from *** percent in 2013 to *** percent in 2014, and then to *** percent in 2015.[184] The domestic industry's capacity to produce HFC components decreased from *** short tons in 2013 to *** short tons in 2014, and *** short tons in 2015.[185] Chemours closed its Chambers Works, New Jersey, R-125 production facility in July 2014.[186] Honeywell ***.[187] Honeywell continues to operate a R-125 production facility in Baton Rouge, Louisiana, and the record shows that capacity utilization at that facility was *** percent in 2015.[188] The domestic industry exported a significant portion of its HFC component production during the POI.[189]

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[179] *See* CR/PR at Table I-25.

[180] During the POI, Arkema produced HFC component R-32, Honeywell produced HFC components R-125 and R-143a, and Chemours produced HFC component R-125 (as well as out-of-scope HFC component R-134a). *See* CR/PR at Table D-1 through D-3.

[181] *See* CR at III-12 to III-14, PR at III-6.

[182] CR at III-3, PR at III-2.

[183] CR/PR at Table IV-3.

[184] CR/PR at Table C-2a.

[185] CR/PR at Table III-6.

[186] CR at III-3 and nn. 6 & 7, PR at III-2 and nn. 6 & 7.

[187] CR/PR at VI-1 n.4.

[188] CR/PR at Table III-6.

[189] The domestic industry's exports of HFC components, as a percentage of total shipments, decreased over the POI, from *** percent in 2013 to *** percent in 2014, and to *** percent in 2015. The industry's export shipments were *** short tons in 2013, *** short tons in 2014, and *** short tons in 2015. CR/PR at Table III-14.

Subject imports were the largest source of supply to the U.S. market during the POI. Their share of the U.S. merchant market increased from *** percent in 2013 to *** percent in 2014, before decreasing to *** percent in 2015.[190]

Nonsubject imports had a minimal and decreasing presence in the U.S. market during the POI. Their share of the U.S. merchant market decreased from *** percent in 2013 to *** percent in 2014, and then increased to *** percent in 2015.[191] The largest nonsubject sources of HFC components during the POI were ***.[192]

c. Substitutability and Other Conditions

We find that there is a high degree of substitutability between the domestic like product and subject imports. All responding U.S. producers and nearly all purchasers and importers reported that domestically produced HFC components, subject imports, and nonsubject imports are "always" or "frequently" interchangeable.[193] When asked about the significance of differences other than price between domestically produced HFC components and subject imports, most reporting U.S. producers and importers indicated that differences other than price between country pairs were "sometimes" or "never" significant; purchasers were more likely to find non-price considerations to be significant.[194] Of the four responding purchasers, one identified price as the most important factor in purchasing decisions for HFC components and two identified price as the second most important factor.[195] In light of this, we find that price is an important factor in purchasing decisions, although so are quality, availability, and reliability of supply.[196]

The primary raw materials used to produce HFC components are hydrofluoric acid ("HF acid") and specific chlorine starting compounds (methylene chloride for R-32; trichloroethylene ("TCE") or percholorethylene ("PCE") for R-125; and methyl chloroform for R-143a).[197] Raw material costs were the largest part of HFC component COGS during the POI, ranging on an annual basis from *** percent to *** percent.[198] The cost of HF acid increased over the POI.[199]

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[190] CR/PR at C-2a.

[191] CR/PR at C-2a.

[192] CR at II-13, PR at II-8. U.S. HFC component producers reported importing HFC components from nonsubject affiliates during the POI. *Id*. (Arkema (France) and Honeywell (Belgium)).

[193] CR at II-28, PR at II-18, and CR/PR at Table II-13.

[194] CR at II-29 to II-30, PR at II-19 to II-20, and CR/PR at Table II-15.

[195] CR/PR at Table II-9a.

[196] CR/PR at Table II-9a; *see also* Hearing Transcript at 153 (Beatty) (importance of availability of supply).

[197] CR at VI-11, PR at VI-7.

[198] CR/PR at Table VI-2.

[199] CR/PR at V-1.

There was reportedly a shortage of HF acid in 2013, resulting in a shortage of R-125.[200] Costs for other raw material inputs to HFC components varied.[201]

2. Volume of Subject Imports[202]

U.S. imports of subject HFC components decreased from *** short tons in 2013 to *** short tons in 2014, before increasing to *** short tons in 2015.[203] U.S. merchant market shipments of subject imports of HFC components decreased steadily from *** short tons in 2013 to *** short tons in 2014 and *** short tons in 2015, an overall decrease of *** percent over the POI.[204] A considerable amount of subject imports of HFC components in 2015 went into the inventory of the *** largest domestic blender, National, for use in the production of HFC blends.[205]

As noted above, the market share of subject imports in the merchant market fluctuated over the POI, increasing from *** percent in 2013 to *** percent in 2014, and then decreasing dramatically to *** percent in 2015.[206] The decrease of subject imports' market share was entirely attributable to an increase in the domestic industry's U.S. market share at a time when apparent U.S. consumption was also increasing significantly. As subject import market share declined *** percentage points and the market share of nonsubject imports declined *** percentage points over the POI, the domestic industry gained *** percentage points of market share.[207]

In light of the foregoing, we find that the volume of subject HFC components is significant in absolute terms and relative to consumption.

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[200] The mineral form of calcium fluoride or fluorspar is used to produce HF; fluorspar is mined only in China and Mexico. CR/PR at V-1.

[201] CR/PR at V-1.

[202] The pertinent legal standards are discussed in section IV.B.2 above

[203] CR/PR at Table IV-2.

[204] CR/PR at Table C-2a. ***. ***.

[205] National's imports of subject HFC components decreased from *** short tons in 2013 to *** short tons in 2014, before increasing substantially to *** short tons in 2015. Its share of imports of subject HFC components over the POI decreased from *** percent in 2013 to *** percent in 2014, before increasing to *** percent in 2015. CR/PR at Table IV-3. National explained that the increase in its imports of subject HFC components in 2015, particularly direct imports of R-32 and R-125, was to ensure an adequately supply of components for blending purposes, given the limitations on the availability of HFC components in the U.S. merchant market caused by the swapping arrangements between *** over the POI. *See* National Importer Questionnaire Response at Question II-2e. National's explanation that it increased imports of HFC components because of limited availability appears to us credible in light of the prevalence of internal consumption and swapping arrangements in the domestic industry and the *** capacity utilization of the domestic R-125 producer in 2015. *See* CR at III-12 to III-15, PR at III-6, and CR/PR at Table III-6. National placed in inventory *** quantities of the HFC component imports. Its inventories increased from *** short tons in 2014 to *** short tons in 2015. *Id*.; National U.S. Importer Questionnaire Response at II-5.

[206] CR/PR at Table C-2a.

[207] CR/PR at Table C-2a.

3. Price Effects of Subject Imports[208]

As addressed in section IV.C.1.c above, the record indicates there is a high degree of substitutability between subject imports of HFC components and the domestic like product. We have also found that price is an important consideration for purchasers choosing among HFC component suppliers, although reliability and availability of supply are also important considerations.

In the final phase of this investigation, the Commission collected pricing data for two HFC component products.[209] Five domestic producers and nine importers provided usable quarterly selling price data and direct import purchase cost data.[210] Pricing data from these firms accounted for 92.3 percent of U.S. producers' commercial shipments of HFC components in 2015 and for *** percent of U.S. commercial shipments of HFC components from China.[211]

The majority of the pricing data for HFC component imports are direct import purchase costs. Consequently, there are limited price comparisons available based on traditional sales from importers to unrelated customers. Albeit limited, these traditional sales data show that subject imports oversold the domestic like product in six of eight quarterly comparisons at margins ranging from *** percent to *** percent, and undersold the domestic like product in the remaining two comparisons at margins ranging from *** percent to *** percent.[212] The quantity of subject imports in the overselling comparisons was *** pounds, while the quantity that undersold the domestic like product totaled *** pounds.[213] [214]

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[208] The pertinent legal standards are discussed in section IV.B.3 above.

[209] These are: Product 5 - R-32 in bulk containers (1,000 lbs. or greater) and Product 6 - R-125 in bulk containers (over 1,000 lbs.). The Commission collected data on both sales and direct imports of the pricing products; direct import purchase cost data accounted for the majority of the data reported for imports of the two HFC component products. *See* CR at V-7, PR at V-5, and CR/PR at Tables V-9 and V-10.

[210] CR at V-6 to V-8, PR at V-4 to V-5, and CR/PR at Table V-4.

[211] CR at V-7, PR at V-5.

[212] CR at V-22, PR at V-8, and CR/PR at Table V-12. The volume of U.S. commercial sales of imported subject components was very small share of total subject imports of components because most imports of subject components were direct imports by HFC blenders and OEMs. CR at V-22 to V-23, PR at V-8 to V-9.

[213] We note, however, that Arkema's imports of R-32 (product 5) accounted for more than *** (*** percent) of the volume of subject imports of HFC components during the quarters in which underselling predominated. Since Arkema is the sole domestic producer of R-32, these imports, although priced lower than the domestic like product, would not have forced Arkema to lower its prices.

[214] CR at V-22, PR at V-8, and CR/PR at Table V-12. In response to the Commission's purchaser's questionnaires, two of four responding purchasers reported they had shifted purchases of HFC components from U.S. producers to subject imports during the POI. CR at V-26, PR at V-10, and CR/PR at Table V-14. One of these purchasers (***) reported that subject import prices were lower and reported that price was the primary reason for the shift to subject imports. Purchasers reported shifting a total of *** short tons of HFC component purchases from the domestic like product to subject imports. CR/PR at Tables V-14 and 15a. Purchaser Dynatemp International reported that it shifted from the domestic like product to subject imports because Honeywell would no longer supply R-125 and (Continued...)

The record data consequently indicate that there was predominant underselling on a volume basis when comparing traditional pricing data. Moreover, the direct import data also indicate that the purchase cost for subject HFC components was significantly lower than the sales price for the domestic like product and that this difference generally exceeded the costs associated with direct importation.[215] Although we find this underselling to be significant in the absolute sense, it did not result in market share shifts in favor of subject imports or adverse price effects. As discussed in section IV.C.2 above, the subject imports lost merchant market share to the domestic industry during the POI, and the 2015 increase in total subject import volume was due to concerns regarding availability, not because of price. Moreover, as explained below, subject HFC component prices did not have adverse effects on prices for the domestic like product.

In this respect, we examined pricing trends.[216] Prices for Product 5 (R-32 in bulk containers) showed minor fluctuations over the POI and were higher in the fourth quarter of 2015 than the first quarter of 2013.[217] While there were large quarterly fluctuations in the prices for the domestic Product 6 (R-125 in bulk containers), these fluctuations appear unrelated to subject import volumes and price levels.[218] We therefore cannot conclude that subject HFC component imports depressed prices for the domestic like product to a significant degree.[219]

We also do not find that subject imports of HFC components prevented price increases which otherwise would have occurred to a significant degree. From 2013 to 2015, the domestic industry's unit COGS and total COGS decreased, while its COGS to net sales ratio gradually improved.[220] Moreover, as discussed above, there does not appear to be any correlation

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other U.S. component producers (Arkema and Honeywell) would no longer supply other HFC components during the POI. CR at II-8, PR at II-5, and CR/PR at Table V-14.

[215] *See* Importer Questionnaires Responses to Questions III-2b and III-2c; CR at V-24 to V-25, PTR at V-9, and CR/PR at Tables V-9 and V-10. We note, however, that the three domestic HFC component producers accounted for most (*** percent) of the purchase cost data for subject imports of product 5. As such, these lower priced subject imports would not necessarily have adversely affected domestic prices.

[216] In our analysis of price trends, we have relied on price data for Pricing Products 5 and 6 covering the entire POI because there is no evidence in the record that indicates the HFC component producers changed their pricing behavior upon the filing of the petition and, indeed, the data indicate that prices for Pricing Products 5 and 6 during the last two quarters of 2015 did not exceed those in the first quarter of 2015. *See* CR/PR at Tables V-9 and V-10.

[217] CR/PR at Table V-9 and Figure V-5.

[218] CR/PR at Table V-10 and Figure V-6.

[219] ***.

[220] The total COGS for the domestic industry's merchant market shipments was $*** in 2013, $*** in 2014, and $*** in 2015. The industry's COGS to net sales ratio for the merchant market was *** percent in 2013, *** percent in 2014, and *** percent in 2015. The unit COGS per short ton for the domestic industry's merchant market shipments was $*** in 2013, $*** in 2014, and $*** in 2015. CR/PR at Table VI-2.
(Continued...)

between subject import volume or price levels and the prices charged for domestically produced HFC components.[221]

Although the domestic industry presumably desired to increase prices further due to its high COGS to net sales ratio, the record does not indicate that the generally stable quantity of subject imports available on the merchant market precluded the industry from attempting this.

Notwithstanding that subject imports generally undersold the domestic like product, this underselling did not result in any increase in subject imports' market penetration in the merchant market, nor did the subject imports significantly depress prices for the domestic like product or prevent price increases that otherwise would have occurred. Consequently, we find that the underselling by subject imports of HFC components did not result in market share shifts, and that the subject imports did not have significant price effects.

4. Impact of Subject Imports[222] [223]

During the POI, some aspects of the domestic component industry's performance improved, while others deteriorated.[224] The domestic industry's capacity declined over the period from *** short tons in 2013 to *** short tons in 2014, and to *** short tons in 2015, but these declines do not appear to be related to the imports of subject components.[225] The industry's production increased from *** short tons in 2013 to *** short tons in 2014, and then

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The domestic industry's total COGS for the overall market was $*** in 2013, $*** in 2014, and $*** in 2015. The industry's COGS to net sales ratio for the overall market was *** percent in 2013, *** percent in 2014, and *** percent in 2015. The unit COGS per short ton for the domestic industry's overall market shipments was $*** in 2013, $*** in 2014, and $*** in 2015. CR/PR at Table VI-1.

[221] *See* CR/PR at Table V-10 and Figure V-6.

[222] The pertinent legal standards are discussed in section IV.B.4 above.

[223] The statute instructs the Commission to consider the "magnitude of the dumping margin" in an antidumping proceeding as part of its consideration of the impact of imports. 19 U.S.C. § 1677(7)(C)(iii)(V). Commerce calculated final antidumping duty margins of 101.82 percent for the investigated producer/exporter combinations and of 216.37 percent for the PRC-Wide Entity. *Commerce Final Determination*, 81 Fed. Reg. at 42316. Commerce calculated these margins based on a much broader class or kind of merchandise than HFC components. While we have considered the magnitude of the margins, in light of the fact that they concern a broader category of merchandise than the domestic like product that we have defined, we have given principal weight to other factors in our Impact analysis.

[224] As discussed above, we have focused our analysis primarily on the merchant market for HFC components when assessing market share and the factors affecting the financial performance of the domestic industry. We have also considered that overall market as well.

[225] CR/PR at Table III-6. This decrease is attributable to Chemours closing of its R-125 feedstock facility in Deepwater, New Jersey, in July 2014, and Honeywell's conversion of an R-125 production unit to HFO (1234yf) production, which is a next-generation refrigerant. *See* CR/PR at Table III-5. Chemours claimed that its shutdown of the R-125 facility was due to low prices of imported HFC blends from China and the deteriorating profitability of HFC blends in the U.S. market rather than imports of HFC components. CR at III-3 n.7, PR at III-2 n.7 and Petitioners Posthearing Brief, Exhibit 1 at 31.

decreased to *** short tons in 2015; the decline was coincident with a commensurate decrease in the domestic industry's export shipments.[226] By contrast, the domestic industry's commercial U.S. shipments increased by *** percent from 2013 to 2015; they declined from *** short tons in 2013 to *** short tons in 2014, and then rose to *** short tons in 2015.[227] Its share of apparent U.S. consumption in the U.S. merchant market increased from *** percent in 2013 to *** percent in 2014 and *** percent in 2015.[228] Capacity utilization fluctuated over the POI, increasing from *** percent in 2013 to *** percent in 2014, before declining to *** percent in 2015.[229] The domestic industry's end-of-period inventories of HFC components increased from 2013 to 2014 before declining in 2015, and were lower in 2015 than in 2013.[230]

The number of production and related workers ("PRWs") for HFC components was steady in 2013 and 2014, but decreased in 2015.[231] Total hours worked followed the same trend,[232] and wages paid also declined from 2013 to 2015.[233] These declines were a function of the closure or conversion of two R-125 production facilities during the POI, which we have previously explained was not due to subject imports of HFC components.[234] Productivity increased during the POI.[235]

The domestic industry's sales revenues declined during the POI, whether calculated on the basis of the merchant market or overall operations.[236] Nevertheless, with respect to both the merchant market and the industry's overall operations, the domestic industry's gross profit,[237] operating income,[238] operating income ratio,[239] and net income,[240] all improved

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[226] CR/PR at Tables III-6 and III-14. The domestic industry's export shipments of HFC components were *** short tons in 2013, *** short tons in 2014, and *** short tons in 2015. CR/PR at Table III-14.

[227] CR/PR at Table III-14. The domestic industry's total U.S. shipments of HFC components increased over the POI and were *** short tons in 2013, *** short tons in 2014, and *** short tons in 2015. *Id*.

[228] CR/PR at Table C-2a. The industry's share of apparent U.S. consumption for the overall HFC components market was *** percent in 2013, *** percent in 2014, and *** percent in 2015. Calculated from CR/PR at Tables III-14 and IV-6.

[229] CR/PR at Table III-6.

[230] The industry's end-of-period inventories were *** short tons in 2013, *** short tons in 2014, and *** short tons in 2015. CR/PR at Table III-20.

[231] The number of PRWs for HFC components was *** in both 2013 and 2014, before decreasing to *** in 2015. CR/PR at Table III-22.

[232] The total number of hours worked was *** in both 2013 and 2014, before declining to *** in 2015. CR/PR at Table III-22.

[233] Wages paid increased from $*** in 2013 to $*** in 2014, before declining to $*** in 2015. CR/PR at Table III-22.

[234] CR at III-3 and nn. 6 & 7, PR at III-2 and nn. 6 & 7; CR/PR at V-1 n.4.

[235] Productivity increased from *** short tons per 1,000 hours in 2013 to *** short tons per 1,000 hours in 2014, and to *** short tons per 1,000 hours in 2015. CR/PR at Table III-22.

[236] CR/PR, Tables VI-1-2.

[237] Gross profit in the merchant market improved from *** in 2013 to *** in 2014, and then to *** in 2015. CR/PR at Table VI-2.

Gross profit in the overall market improved from *** in 2013 to ***, and then to *** in 2015. CR/PR at Table VI-1.

overall between 2013 and 2015, although most profit indicators were *** throughout the POI.[241] The industry's total capital expenditures for HFC components declined over the POI, with Chemours[242] and Honeywell reporting their highest capital expenditures in 2013, while Arkema reported its highest expenditures in 2015.[243]

As previously stated, subject imports, although they maintained a significant presence in the U.S. market during the POI, did not capture market share from the domestic industry in the merchant market; instead, the domestic industry was able to increase both its commercial shipments and overall shipments. To the extent that the industry could not increase shipments further, this was due partially to the nature of its supply arrangements – in which most production was internally transferred or subject to contractual swap commitments,[244] and partially due to its limited ability to furnish additional quantities of R-125, a component needed to make all in-scope HFC blends.[245] To the extent the domestic industry was unable to charge sufficiently high prices to obtain revenues sufficient for profitable operations, this was not due to subject imports for the reasons stated above.[246] In light of these considerations, we do not

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[238] Operating income in the merchant market improved from *** in 2013 to *** in 2014, and then to *** in 2015.

Operating income in the overall market also improved from *** in 2013 to *** in 2014, and then to *** in 2015. CR/PR at Table VI-1.

[239] The industry's operating income to net sales ratio for the merchant market improved from *** percent in 2013, to *** percent in 2014, and then to *** percent in 2015. CR/PR at Table VI-2.

The industry's operating income to net sales ratio for the overall market improved from *** percent in 2013 to *** percent in 2014, and then to *** percent in 2015. CR/PR at Table VI-1.

[240] Net income in the merchant market improved from *** in 2013 to *** in 2014, and then to *** in 2015. CR/PR at Table VI-2.

Net income in the overall market improved from *** in 2013 to *** in 2014, and then to *** in 2015. CR/PR at Table VI-1.

[241] CR/PR at Table VI-2. In the merchant market, all of the industry's profit indicators were ***. For the industry's overall operations, all of the profit indicators were *** in 2013 and 2014, but *** in 2015. CR/PR at Table VI-1.

[242] Chemours reported that its capital expenditures decreased in 2015 from 2014, due to the closure of its R-125 facility in July 2014. CR at VI-24 n.42, PR at VI-10 n.42.

[243] CR at VI-24 n.41, PR at VI-10 n.41, and CR/PR at Table VI-7. The industry did not report any R&D expenditures for HFC components during the POI. *See* CR/PR at Table VI-7.

[244] CR/PR at Tables III-9 and III-14.

[245] The domestic industry's capacity utilization for the production of R-125 was *** percent in 2013, *** percent in 2014, and *** percent in 2015. CR/PR at Table III-6. Subject imports of R-125 in 2015 (*** short tons) far exceeded the domestic industry's remaining production capacity for this product (*** short tons) in that year. *Compare* CR/PR at Table III-6 *with* Table IV-2.

[246] Petitioners allege that National declined shipments of HFC components from domestic component producers because of low priced subject imports. Petitioners Posthearing Brief, Exhibit 1 at 48 to 49. The record indicates, however, that National declined domestic producers' offers for the sale of HFC components in order to manage its inventory position for HFC components. *See* National Posthearing Brief, Appendix at A-80 to A-81 and Exhibit 1.

find that the subject imports were responsible for any difficulties that the domestic industry may have experienced and did not prevent it from obtaining significant additional sales or revenues.

Consequently, we find that subject HFC component imports have not had a significant impact on the domestic industry.

C. No Threat of Material Injury by Reason of Subject HFC Components

1. Legal Standards

Section 771(7)(F) of the Tariff Act directs the Commission to determine whether the domestic industry is threatened with material injury by reason of the subject imports by analyzing whether "further dumped or subsidized imports are imminent and whether material injury by reason of imports would occur unless an order is issued or a suspension agreement is accepted."[247] The Commission may not make such a determination "on the basis of mere conjecture or supposition," and considers the threat factors "as a whole" in making its determination whether dumped or subsidized imports are imminent and whether material injury by reason of subject imports would occur unless an order is issued.[248] In making our determination, we consider all statutory threat factors that are relevant to this investigation.[249]

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[247] 19 U.S.C. § 1677(7)(F)(ii).

[248] 19 U.S.C. § 1677(7)(F)(ii).

[249] These factors are as follows:

> . . .,
>
> (II) any existing unused production capacity or imminent, substantial increase in production capacity in the exporting country indicating the likelihood of substantially increased imports of the subject merchandise into the United States, taking into account the availability of other export markets to absorb any additional exports,
>
> (III) a significant rate of increase of the volume or market penetration of imports of the subject merchandise indicating the likelihood of substantially increased imports,
>
> (IV) whether imports of the subject merchandise are entering at prices that are likely to have a significant depressing or suppressing effect on domestic prices and are likely to increase demand for further imports,
>
> (V) inventories of the subject merchandise,
>
> (VI) the potential for product-shifting if production facilities in the foreign country, which can be used to produce the subject merchandise, are currently being used to produce other products,
>
> …,
>
> (VIII) the actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the domestic like product, and
>
> (IX) any other demonstrable adverse trends that indicate the probability that there is likely to be material injury by reason of imports (or sale for importation) of the subject merchandise (whether or not it is actually being imported at the time).

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2. Analysis

Likely Volume of Subject Imports. Subject import volume and market share trends during the POI do not support a finding that there is a likelihood of a significant rate of increase in subject imports in the imminent future. While subject import volume did increase in 2015, this was primarily due to National's need to augment its HFC component inventories due to the unavailability of domestic product, as discussed above in section IV.C.2. Because National is a refrigerant blender, it will use these HFC component inventories to produce HFC and other refrigerant blends rather than offer them for sale on the merchant market.[250] Thus, neither the increase in subject imports of HFC components nor the increase of U.S. inventories of these components in 2015, each of which is attributable to National, is indicative of likely volume trends in the imminent future.[251] We find that the likely trend for subject import volume will be a continuation of the flat subject import levels that were apparent prior to 2015.[252]

We also find that the data in the record concerning capacity in China does not indicate the likelihood of substantially increased imports of subject merchandise.[253] The record shows that the Chinese HFC component industry had high and increasing capacity utilization over the POI.[254] Although the industry in China possesses, and is likely to continue to possess, unused capacity, we note that this did not result in the responding producers substantially increasing their export shipments to the United States during the POI.[255] Moreover, most of the Chinese industry's HFC component production was internally consumed or shipped to home market customers to produce refrigerant blends.[256]

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19 U.S.C. § 1677(7)(F)(i). To organize our analysis, we discuss the applicable statutory threat factors using the same volume/price/impact framework that applies to our material injury analysis. Statutory threat factors (II), (III), (V), and (VI) are discussed in the analysis of subject import volume. Statutory threat factor (IV) is discussed in the analysis of subject import price effects. Statutory factors (VIII) and (IX) are discussed in the analysis of impact. Statutory factors (I) concerning countervailable subsidies and (VII) concerning agricultural products are inapplicable to this investigation.

[250] National Posthearing Brief, Appendix A-28 to A-29, A-88 to A-89; *see also* CR/PR at Tables III-10 and D-7.

[251] *See* CR/PR at Tables IV-3 and VII-8; National U.S. Importer Questionnaire Response at II-5. Inventories of subject merchandise in China were at modest and declining levels relative to production and shipments during the POI. CR/PR at Table VII-3.

[252] As discussed above, the volume of subject HFC component imports declined *** between 2013 and 2014. CR/PR at Table C-2a.

[253] CR at VII-7 to VII-8, and CR/PR at Tables VII-2 to VII-4.

[254] The Chinese industry's capacity utilization for HFC components was *** percent in 2013, *** percent in 2014, and *** percent in 2015. CR/PR at Table VII-3.

[255] Export shipments of reporting Chinese HFC component producers increased from *** short tons in 2013 to *** short tons in 2015, but shipments to the United States increased only slightly overall from *** short tons in 2013 to *** short tons in 2015. CR/PR at Table VII-3.

[256] CR at VII-8, PR at VII-4, and CR/PR at Table VII-3. Chinese home market shipments of subject HFC components increased over the POI and were *** short tons in 2013, *** short tons in 2014, and *** short tons in 2015. The ratio of home market shipments to total shipments of subject HFC (Continued...)

Petitioners argue that any antidumping duty order issued on HFC blends from China that does not also include HFC components from China makes it likely that Chinese HFC component producers will increase their shipments to the United States.[257] As explained above, the merchant market for components is relatively small and the main purchasers are the three domestic component producers and National, all of which are blenders. These blenders have had unrestricted access to Chinese components throughout the POI and yet shipments of subject imports in the market remained relatively flat. To the extent that new blenders might emerge in the United States to supply the HFC blend market using HFC components sourced in China, we find it highly speculative that this would occur, particularly in the imminent future, given the substantial investment, the nature of the production equipment, and the technical expertise required to perform blending operations.

Consequently, the record supports our conclusion that the subject imports levels prevailing in 2013 and 2014 are likely to persist and are unlikely to change in the imminent future.

Likely Price Effects of Subject Imports. We find that imports of subject merchandise are not entering at prices that are likely to have a significant depressing or suppressing effect on domestic prices. We found above that, during the period of investigation, while subject imports were generally priced lower than the domestic like product, underselling by subject imports did not result in market share shifts, and subject imports did not cause significant price depression or suppression. There is no evidence in the record that indicates any imminent changes in the conditions of competition that would make significant price effects from subject imports likely in the imminent future given that they did not occur during the POI. Therefore, given our finding that the volume of subject imports of components is likely to be stable, we find that subject imports are not likely to enter at prices that are likely to have a significant depressing or suppressing effect on domestic prices, or are likely to increase demand for further imports.

Likely Impact of Subject Imports. As we discussed above, several indicators of the condition of the domestic HFC component industry improved or remained steady during the period of investigation. Moreover, we found that the subject imports had no significant impact on the domestic industry's market share, revenues, or financial performance during the period of investigation. Nothing in the record of this investigation gives us reason to believe that subject imports will cause the condition of the domestic industry to deteriorate to a significant degree in the imminent future.

We further find that subject imports have had no significant actual or potential negative effects on the existing development and production efforts of the domestic industry, including

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(…Continued)
components were *** percent in 2013, *** percent in 2014, and *** percent in 2015. CR/PR at Table VIII-3. We further note that product shifting is unlikely because only one of seven responding subject producers of in-scope components in China reported producing other products using the same equipment as in-scope components and this production accounted for approximately *** percent of overall production in 2015. CR at VII-8 n.8, PR at VII-4 n.8. There are no outstanding antidumping or countervailing duty orders concerning HFC components from China. *See* CR at VII-18, PR at VII-10.

[257] *See* Petitioners Posthearing Brief, Exhibit 1 at 31, 40 to 43.

efforts to develop derivative or more advanced versions of the domestic like product. In fact, as noted above, Honeywell converted an HFC component facility producing R-125 to the production of a next-generation refrigerant HFO (1234yf) during the POI.[258]

There is also no evidence that subject imports of HFC components from China will have a significant negative effect on the performance of the domestic industry. There is no indication that the conditions of competition prevailing during the POI will change significantly in the imminent future. Given our conclusion that subject imports from China are not likely to increase substantially in the imminent future and will not likely have significant price effects, we find that subject imports from China will not likely have a significant impact on the performance of the domestic HFC component industry.

In view of the foregoing, we conclude that an industry in the United States is not threatened with material injury by reason of subject imports of HFC components from China.

Conclusion

For the reasons stated above, we determine that a domestic industry in the United States producing HFC blends is materially injured by reason of subject imports from China found to be sold in the United States at less than fair value. We also find that critical circumstances do not exist with respect to subject imports of HFC blends from China. We further determine that a domestic industry producing HFC components is not materially injured or threatened with material injury by reason of subject imports from China found to be sold in the United States at less than fair value.

[258] CR/PR at VI-1 n.4.

PART I: INTRODUCTION

BACKGROUND

This investigation results from a petition filed on June 25, 2015, with the U.S. Department of Commerce ("Commerce") and the U.S. International Trade Commission ("USITC" or "Commission") by the American HFC Coalition, and its members: Amtrol, Inc. ("Amtrol"), West Warwick, Rhode Island; Arkema, Inc. ("Arkema"), King of Prussia, Pennsylvania; The Chemours Company FC, LLC ("Chemours"), Wilmington, Delaware; Honeywell International Inc. ("Honeywell"), Morristown, New Jersey; Hudson Technologies ("Hudson"), Pearl River, New York; Mexichem Fluor Inc. ("Mexichem"), St. Gabriel, Louisiana; Worthington Industries, Inc. ("Worthington"), Columbus, Ohio; and District Lodge 154 of the International Association of Machinists and Aerospace Workers ("IAMAW"),[1] alleging that an industry in the United States is materially injured and threatened with material injury by reason of less-than-fair-value ("LTFV") imports of certain single hydrofluorocarbon ("HFC")[2] components and certain HFC blends imported from China. The following tabulation provides information relating to the background of this investigation.[3] [4]

[1] The Commission did not grant Amtrol and Worthington interested party status because neither qualifies as an interested party under 19 § U.S.C. 1677(9). Neither firm produces or blends the subject products.

[2] See the section entitled "The Subject Merchandise" in *Part I* of this report for a complete description of the merchandise that is part of the scope in this investigation. Throughout this report, the subject merchandise is referred to as "in-scope components" (R-32, R-125, and R-143a), "in-scope blends" (R-404A, R-407A, R-407C, R410A, and R-507A), and "in-scope products" (both in-scope components and blends combined). "Out-of-scope component" and "R-134a" refer to the out-of-scope HFC component R-134a because it is an input for the production of three out of five in-scope blends. Although R-134a is excluded from the scope of the petition, data were collected for U.S. production, imports, and foreign production of R-134a. "HFC components" refer to R-32, R-125, R-143a, and out-of-scope R-134a. "Out-of-scope blends" or "refrigerant blends" refer to any refrigerant blend that is not one of the five in-scope blends listed above. These include all other refrigerant blends, including HFC, CFC, HCFC, and HFO blends, both proprietary and patented refrigerant blends. "U.S. producers" refer to producers of the in-scope components, blenders of in-scope blends, and reclaimers of in-scope blends and components. "Integrated producers" refer to the three U.S. producers (Arkema, Chemours, and Honeywell) of both in-scope components and blends while "stand-alone blenders/reclaimers" refer to firms reporting blending and/or reclaiming in-scope products but did not have HFC component production. Data for out-of-scope component R-134a were gathered from U.S. producers, U.S. importers, and foreign producers/exporters in China and labeled accordingly.

[3] Pertinent *Federal Register* notices are referenced in appendix A, and may be found at the Commission's website (www.usitc.gov).

[4] A list of witnesses appearing at the hearing is presented in appendix B of this report.

Effective date	Action
June 25, 2015	Petition filed with Commerce and the Commission; institution of Commission investigation (80 FR 38231, July 2, 2015)
July 22, 2015	Commerce's notice of initiation (80 FR 43387)
August 10, 2015	Commission's preliminary determination (81 FR 2903, January 19, 2016)
February 1, 2016	Commerce's preliminary determination (81 FR 5098); scheduling of final phase of Commission investigation (81 FR 10662, March 1, 2016)
June 21, 2016	Commission's hearing
June 29, 2016	Commerce's final determination (81 FR 42314)
July 22, 2016	Commission's vote
August 5, 2016	Commission's views

STATUTORY CRITERIA AND ORGANIZATION OF THE REPORT

Statutory criteria

Section 771(7)(B) of the Tariff Act of 1930 (the "Act") (19 U.S.C. § 1677(7)(B)) provides that in making its determinations of injury to an industry in the United States, the Commission—

> *shall consider (I) the volume of imports of the subject merchandise, (II) the effect of imports of that merchandise on prices in the United States for domestic like products, and (III) the impact of imports of such merchandise on domestic producers of domestic like products, but only in the context of production operations within the United States; and. . . may consider such other economic factors as are relevant to the determination regarding whether there is material injury by reason of imports.*

Section 771(7)(C) of the Act (19 U.S.C. § 1677(7)(C)) further provides that--[5]

> *In evaluating the volume of imports of merchandise, the Commission shall consider whether the volume of imports of the merchandise, or any increase in that volume, either in absolute terms or relative to production or consumption in the United States is significant.*
> *. . .*
> *In evaluating the effect of imports of such merchandise on prices, the Commission shall consider whether. . .(I) there has been significant price*

[5] Amended by PL 114-27 (as signed, June 29, 2015), Trade Preferences Extension Act of 2015.

underselling by the imported merchandise as compared with the price of domestic like products of the United States, and (II) the effect of imports of such merchandise otherwise depresses prices to a significant degree or prevents price increases, which otherwise would have occurred, to a significant degree.

. . .

In examining the impact required to be considered under subparagraph (B)(i)(III), the Commission shall evaluate (within the context of the business cycle and conditions of competition that are distinctive to the affected industry) all relevant economic factors which have a bearing on the state of the industry in the United States, including, but not limited to . . . (I) actual and potential decline in output, sales, market share, profits, productivity, return on investments, and utilization of capacity, (II) factors affecting domestic prices, (III) actual and potential negative effects on cash flow, inventories, employment, wages, growth, ability to raise capital, and investment, (IV) actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the domestic like product, and (V) in {an antidumping investigation}, the magnitude of the margin of dumping.

Organization of report

Part I of this report presents information on the subject merchandise, dumping margins, and domestic like product. *Part II* of this report presents information on conditions of competition and other relevant economic factors. *Part III* presents information on the condition of the U.S. industry, including data on capacity, production, shipments, inventories, and employment. *Parts IV* and *V* present the volume of subject imports and pricing of domestic and imported products, respectively. *Part VI* presents information on the financial experience of U.S. producers. *Part VII* presents the statutory requirements and information obtained for use in the Commission's consideration of the question of threat of material injury as well as information regarding nonsubject countries.

MARKET SUMMARY

HFC components and blends are generally used as the cooling agent in refrigeration and air conditioning. The vast majority of in-scope products in the United States are made by four producers (***).[6] Data for out-of-scope component R-134a include the U.S. production of in-

[6] One additional in-scope blender/reclaimer (***) provided data on its in-scope production activities and is included in the data for the U.S. industry. Five additional HFC blender/reclaimers (*** provided

(*continued*...)

scope producers Arkema and Chemours as well as the production by Mexichem, a producer of out-of-scope R-134a only. The tabulation below summarizes the production activities of responding U.S. producers of both in-scope and out-of-scope products and includes the responses of small blenders and reclaimers.

* * * * * * *

China is the largest producer of HFCs in the world. In 2015, the top producers of in-scope products in China are *** and ***, respectively. For the production of out-of-scope R-134a in 2015, three firms (***) accounted for the vast majority of R-134a produced in China.

In 2015, the top U.S. importer of the in-scope components from China is ***. The top U.S. importers of in-scope blends are ***. Two U.S. importers, *** also imported in-scope components from nonsubject countries (***) and no U.S. importer reported imports of in-scope blends from nonsubject countries.

Apparent U.S. consumption of in-scope products totaled approximately *** short tons valued at ($***) in 2015. Three firms (Arkema, Chemours, and Honeywell) produced in-scope components in the United States from 2013 to 2015 and at least six firms are known to produce the in-scope blends in the United States (Arkema, Chemours, ***, Honeywell, ***, and National). For apparent consumption, U.S. producers' U.S. shipments of in-scope products totaled *** short tons valued at ($***) in 2015, and accounted for *** percent of apparent U.S. consumption by quantity and *** percent by value. U.S. imports of in-scope products from China totaled *** short tons valued at ($***) in 2015 and accounted for *** percent of apparent U.S. consumption by quantity and *** percent by value. U.S. imports from nonsubject sources totaled *** short tons valued at ($***) in 2015 and accounted for *** percent of apparent U.S. consumption by both quantity and value.

SUMMARY DATA AND DATA SOURCES

A summary of data collected in this investigation is presented in appendix C, tables C-1 to C-6b. Except as noted, U.S. industry data are based on the questionnaire responses of three firms (Arkema, Chemours, and Honeywell) that accounted for all known U.S. production of in-scope components and six firms (***) that accounted for the vast majority of the U.S. production of in-scope blends during 2015.[7] U.S. imports of in-scope products are based on the

(…*continued*)
partial questionnaire responses and are included primarily in the discussion regarding the domestic like product.

[7] HFC reclaimers (also known as recyclers) can also blend the in-scope HFC blends in their facilities. Seven out of ten responding in-scope U.S. producers *** are involved in the recycling and reclaiming of in-scope HFC. Two responding U.S. producers, ***, reported reclaiming out-of-scope R-22. Four HFC reclaimers/blenders (***) did not provide completed questionnaires and their partial responses are included where appropriate.

questionnaire responses of sixteen U.S. importers of HFC. U.S. imports of R-134a are ***.[8] Information on the industry in China is based on the questionnaire responses of sixteen in-scope producers/exporters in China.

PREVIOUS AND RELATED INVESTIGATIONS

Out-of-scope component, R-134a (also known as "1,1,1,2-tetrafluoroethane" and HFC-134a), has been the subject of prior and ongoing unfair trade investigations in the United States. On December 31, 2007, the Commission instituted a section 337 investigation on R-134a, based on a complaint filed by INEOS Fluor Holdings Ltd.[9] [10] against Sinochem.[11] The complaint alleged violations of section 337 by reason of infringement of various process patents used in the manufacture of R-134a. On December 1, 2008, the ALJ determined that Sinochem had violated section 337. On June 1, 2009, the Commission determined to review the remand determination and reversed the conclusion of nonobviousness of the patent infringement claims finding that the claim would have been obvious to one of ordinary skill in the art and was therefore invalid. With its finding of no patent infringement, the Commission terminated its 337 investigation on R-134a in 2009.[12]

On October 22, 2013, Mexichem filed antidumping and countervailing duty petitions with the Commission and Commerce concerning R-134a from China. In October 2014, Commerce found that such imports were being sold at less than fair value, at a margin of 280.67 percent.[13] In December 2014, the Commission determined that an industry in the United States was not materially injured or threatened with material injury, and the establishment of an industry in the United States was not materially retarded, by reason of imports of R-134a from China.[14] Mexichem subsequently appealed the Commission's negative determinations to the U.S. Court of International Trade, *Mexichem v. United States*, Court No. 15-00004, filing its complaint on February 4, 2015. The Commission's negative determinations are currently under appeal.

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[8] ***.

[9] *In the Matter of Certain R-134a Coolant (Otherwise Known as 1,1,1,2—Tetrafluoroethane*), ITC Publication No. 4150 (December 2010).

[10] In April 2010, INEOS Fluor Holdings, Ltd. sold its refrigerant business to Mexichem.

[11] *In the Matter of Certain R-134a Coolant (Otherwise Known as 1,1,1,2—Tetrafluoroethane)*, USITC Publication No. 4150 (December 2010).

[12] *In the Matter of Certain R–134a Coolant (Otherwise Known as 1,1,1,2-Tetrafluoroethane); Notice of Commission Determination To Reverse the Remand Determination of the Presiding Administrative Law Judge and To Terminate the Investigation in Its Entirety With a Finding of No Violation*, 74 FR 39968, August 10, 2009.

[13] *1,1,1,2-Tetrafluroethane From the People's Republic of China: Final Determination of Sales at Less Than Fair Value*, 79 FR 62597, October 20, 2014.

[14] *1,1,1,2-Tetrafluoroethane from China, Investigation Nos. 701-TA-509 and 731-TA-1244 (Final),* USITC Publication 4503, December 2014.

On March 3, 2016, the American HFC Coalition and its individual members and District Lodge 154 of the International Association of Machinists and Aerospace Workers filed an antidumping duty petition on imports of R-134a from China. In April 2016, the Commission preliminarily determined that an industry in the United States was materially injured by imports of R-134a from China. Commerce is expected to issue its preliminary determination on the antidumping duty petition on R-134a from China in August 2016.

NATURE AND EXTENT OF ALLEGED SALES AT LTFV

Sales at LTFV

On June 29, 2016, Commerce published a notice in the *Federal Register* of its final determination of sales at LTFV with respect to imports of in-scope products from China.[15] Table I-1 presents Commerce's final dumping margins on these imports.

Table I-1
HFC: Commerce's final weighted-average LTFV margins with respect to in-scope imports from China

Exporter	Producer	Final dumping margin (*percent*)
T.T. International Co., Ltd.	Sinochem Environmental Protection Chemicals (Taicang) Co., Ltd.; Zhejiang Lantian Environmental Protection Fluorine Materials Co., Ltd.; Jinhua Yonghe Fluorochemical Co., Ltd.; Zhejiang Sanmei Chemical Industry Co., Ltd.; Shandong Huaan New Material Co., Ltd.; Zhejiang Zhonglan Refrigeration Technology Co., Ltd.; and, Dongyang Weihua Refrigerants Co., Ltd.	101.82
Daikin Fluorochemicals (China) Co., Ltd.	Daikin Fluorochemicals (China) Co., Ltd.	101.82
Jinhua Yonghe Fluorochemical Co., Ltd.	Zhejiang Yonghe Refrigerant Co., Ltd.	101.82
Shandong Huaan New Material Co., Ltd.	Shandong Huaan New Material Co., Ltd.	101.82
Weitron International Refrigeration Equipment (Kunshan) Co., Ltd.	Zhejiang Lantian Environmental Protection Fluoro Material Co., Ltd.; Sinochem Environmental Protection Chemicals (Taicang) Co., Ltd.; Zhejiang Quzhou Lianzhou Refrigerants Co., Ltd.; and Zhejiang Sanmei Chemical Industry Co., Ltd.	101.82
Zhejiang Yonghe Refrigerant Co., Ltd.	Jinhua Yonghe Fluorochemical Co., Ltd.	101.82
Zhejiang Sanmei Chemical Industry Co., Ltd.	Zhejiang Sanmei Chemical Industry Co., Ltd. and Jiangsu Sanmei Chemicals Co., Ltd.	101.82
PRC-Wide Entity[1]		216.37

[1] This also includes Shandong Dongyue Chemical Co., Ltd., Sinochem Lantian Trade Co., Ltd., Sinochem Environmental Protection Chemicals (Taicang) Co. Ltd., Zhejiang Lantian Environmental Protection Fluoro Material Co., Ltd., Zhejiang Quhua Fluor-Chemistry Co., Ltd., and Zhejiang Quzhou Lianzhou Refrigerants Co., Ltd.

Source: 81 FR 42314, June 29, 2016.

[15] *Hydrofluorocarbon Blends and Components Thereof from the People's Republic of China: Final Determination of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances*, 81 FR 42314, June 29, 2016.

THE SUBJECT MERCHANDISE

Commerce's scope

Commerce has defined the scope of this investigation as follows:[16]
The products subject to this investigation are hydrofluorocarbons (HFCs) and single HFC components of those blends thereof, whether or not imported for blending. HFC blends covered by the scope are R–404A, a zeotropic mixture consisting of 52 percent 1,1,1-Trifluoroethane, 44 percent Pentafluoroethane, and 4 percent 1,1,1,2-Tetrafluoroethane; R–407A, a zeotropic mixture of 20 percent Difluoromethane, 40 percent Pentafluoroethane, and 40 percent 1,1,1,2-Tetrafluoroethane; R–407C, a zeotropic mixture of 23 percent Difluoromethane, 25 percent Pentafluoroethane, and 52 percent 1,1,1,2-Tetrafluoroethane; R–410A, a zeotropic mixture of 50 percent Difluoromethane and 50 percent Pentafluoroethane; and R–507A, an azeotropic mixture of 50 percent Pentafluoroethane and 50 percent 1,1,1-Trifluoroethane also known as R–507. The foregoing percentages are nominal percentages by weight. Actual percentages of single component refrigerants by weight may vary by plus or minus two percent points from the nominal percentage identified above.[17]

The single component HFCs covered by the scope are R-32, R-125, and R-143a. R-32 or Difluoromethane has the chemical formula CH_2F_2, and is registered as CAS No. 75-10-5. It may also be known as HFC-32, FC-32, Freon-32, Methylene difluoride, Methylene fluoride, Carbon fluoride hydride, halocarbon R32, fluorocarbon R32, and UN 3252. R-125 or 1,1,1,2,2-Pentafluoroethane has the chemical formula CF_3CHF_2 and is registered as CAS No. 354-33-6. R-125 may also be known as R-125, HFC-125, Pentafluoroethane, Freon 125, and Fc-125, R-

[16] *Hydrofluorocarbon Blends and Components Thereof from the People's Republic of China: Final Determination of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances, 81 FR 42314, June 29, 2016.*

[17] "R–404A is sold under various trade names, including Forane® 404A, Genetron® 404A, Solkane® 404A, Klea® 404A, and Suva®404A. R–407A is sold under various trade names, including Forane® 407A, Solkane® 407A, Klea®407A, and Suva®407A. R–407C is sold under various trade names, including Forane® 407C, Genetron® 407C, Solkane® 407C, Klea® 407C and Suva® 407C. R–410A is sold under various trade names, including EcoFluor R410, Forane® 410A, Genetron® R410A and AZ–20, Solkane® 410A, Klea® 410A, Suva® 410A, and Puron®. R–507A is sold under various trade names, including Forane® 507, Solkane® 507, Klea®507, Genetron®AZ–50, and Suva®507. R–32 is sold under various trade names, including Solkane®32, Forane®32, and Klea®32. R–125 is sold under various trade names, including Solkane®125, Klea®125, Genetron®125, and Forane®125. R–143a is sold under various trade names, including Solkane®143a, Genetron®143a, and Forane®125." Ibid.

125. R-143a or 1,1,1-Trifluoroethane has the chemical formula CF_3CH_3 and is registered as CAS No. 420-46-2. R-143a may also be known as R-143a, HFC-143a, Methylfluoroform, 1,1,1-Trifluoroform, and UN2035.

Also included are semi-finished blends of Chinese HFC components. Except as described below, semi-finished blends are blends of two Chinese HFCs components (i.e., R–32, R–125, and R–143a), as well as blends of any one of these components with Chinese R–134a, that are used to produce the subject HFC blends that have not been blended to the specific proportions required to meet the definition of one of the subject HFC blends described above (R–404A, R–407A, R–407C, R–410A, and R–507A).

This investigation includes any Chinese HFC components (i.e., R–32, R–125, and R– 143a), as well as Chinese R–134a,[18] that are blended in a third country to produce a subject HFC blend before being imported into the United States. Chinese R–134a is not subject to the scope of this investigation unless it is blended with another Chinese HFC component (i.e., R–32, R–125, and R–143a) into a subject blend or semi-finished blend before being imported into the United States.

Any blend or semi-finished blend that includes an HFC component other than R–32, R–125, R–143a, or R–134a is excluded from the scope of this investigation. Furthermore, semi-finished blends do not include any blends containing both HFCs R–32 and R–143a. Single-component HFCs and semifinished HFC blends are not excluded from the scope of this investigation when blended with HFCs from non-subject countries.

Excluded from this investigation are blends of refrigerant chemicals that include products other than HFCs, such as blends including chlorofluorocarbons ("CFCs") or hydrochlorofluorocarbons ("HCFCs"), hydrocarbons ("HCs"), or hydrofluoroolefins ("HFOs").

Also excluded from this investigation are patented HFC blends, including, but not limited to, ISCEON® blends, including MO99TM (R–438A), MO79 (R–422A), MO59 (R–417A), MO49PlusTM (R–437A) and MO29TM (R–4 22D), Genetron® PerformaxTM LT (R–407F), Choice® R–421A, and Choice® R–421B.

[18] "However, if the only Chinese content of such a third country blend is the R–134a portion, then such a third country blend is excluded from the scope of this investigation." *Hydrofluorocarbon Blends and Components Thereof from the People's Republic of China: Final Determination of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances, 81 FR 42314, June 29, 2016.*

HFC blends covered by the scope of this investigation are currently classified in the Harmonized Tariff Schedule of the United States ("HTSUS") at subheadings 3824.78.0020 and 3824.78.0050.[19] Single component HFCs are currently classified at subheadings 2903.39.2035 and 2903.39.2045,[20] HTSUS.[21] Although the HTSUS subheadings and CAS registry numbers are provided for convenience and customs purposes, the written description of the scope is dispositive.

Tariff treatment

Based upon the scope set forth by the Department of Commerce, single component HFCs included in the scope of this investigation are currently classified in subheading 2903.39.20 of the Harmonized Tariff Schedule of the United States ("HTS") and imported under statistical reporting number 2903.39.2035.[22] HFC blends included in the scope of this investigation are currently classified in subheading 3824.78.00 (statistical reporting number 3824.78.0020).[23] Both of these HTS subheadings have a general duty rate of 3.7 percent ad valorem.

[19] HTSUS 3824.78.0050 is outside of the 2016 statistical reporting number for in-scope HFC blends.

[20] HTSUS 2903.39.2045 is outside of the 2016 statistical reporting number for in-scope HFC components.

[21] "We note that HFC blends were classified at HTSUS subheading 3824.78.0000 and single component HFCs were classified at HTSUS subheading 2903.39.2030 in 2015." *Hydrofluorocarbon Blends and Components Thereof from the People's Republic of China: Final Determination of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances, 81 FR 42314, June 29, 2016.*

[22] Prior to 2016, single component HFCs subject to this investigation were imported under HTS statistical reporting number 2903.39.2030.

[23] Prior to 2016, imports of HFC blends subject to this investigation were not separately collected under HTS subheading 3824.78.00, which had no subordinate statistical reporting numbers.

THE PRODUCT[24]

Description and applications

Hydrofluorocarbons (HFCs) are synthetic chemical compounds containing only hydrogen, fluorine, and carbon. They do not occur naturally. Unlike CFCs and HCFCs, HFCs have no ozone depleting potential because they do not contain chlorine.[25] Individual component HFCs and the blends containing them are colorless, odorless gases that are generally used for refrigeration and air conditioning application, although certain HFC components can also be used for flame suppression, aerosol propellants, foam blowing, and as precursors for polymers.

The HFC blends subject to this investigation are used almost exclusively for refrigeration and air conditioning.[26] These two major end uses are further categorized into residential air conditioning and heat pumps, commercial air conditioning, commercial refrigeration (e.g., walk-in coolers and supermarket display cases), transportation refrigeration, and process refrigeration (e.g., food processing and chemical manufacturing).[27] As they were developed to replace R-22, a single refrigerant, in these low- and medium-temperature conditions, the subject blends have considerable overlap in their applications.[28]

The individual HFCs subject to this investigation are used primarily as inputs for the subject HFC blends but also have limited applications as fire suppressants (R-125) and propellants (R-143a).[29] R-32 was approved in February 2015 for self-contained air conditioning systems. Given how recently this change occurred, there are no data available yet on its impact on the market.[30]

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[24] The American Society of Heating, Refrigeration, and Air Conditioning Engineers ("ASHRAE") assigns the letter R and the numbers to refrigerants in sequential order based on when the new refrigerant is developed. Hearing transcript, p. 69 (Minor). For HFC products, the "R" can be replaced with the actual chemical "HFC", so R-32 is also HFC-32, R-125 is also HFC-125, R-134a is also HFC-134a, R-143a is also HFC-143a, and the same for in-scope blends. For other refrigerants, the "R" can be replaced with the relevant chemical composition such as "CFC", "HCFC", or "HFO" so R-22 is HCFC-22, R-12 is CFC-12, R-1234yf is HFO-1234yf.

[25] HFCs were a family of products that were developed in the 1990s when previous generations of refrigerants, such as CFCs and HCFCs, were phased out by the Environmental Protection Agency ("EPA") due to their ozone depleting properties. The key HCFC was R-22, commonly referred to as "Freon," a "workhorse" refrigerant that had favorable thermodynamic properties which allowed it to be used in a wide range of applications. As R-22 was being phased out, the industry worked to develop a new group of refrigerant blends that would be able to replace R-22 in the market. As a result, U.S. producers began to build HFC component facilities to create the "building blocks" for HFC blends to replace R-22 in the market. These HFC blends do not contain chlorine, do not deplete the ozone, are not toxic, and are not flammable. Conference transcript, p. 27-28 (Sassano).

[26] Petition, p. 17.

[27] Petition, pp. 18-19.

[28] Petition, p. 19.

[29] Petition, pp. 20, 34.

[30] Petition, pp. 157-158.

Manufacturing processes

Single-component HFCs (also called “halocarbon gases”), such as R-32, R-125 and R-143a, are manufactured by reacting hydrofluoric acid with a chlorine starting compound, such as methylene chloride, tetrachloroethylene or trichloroethane. This reaction, known as hydrofluorination, yields a carbon-hydrogen-fluorine compound and hydrochloric acid. Thus, R-32 (difluoromethane) is manufactured by hydrofluorination of methylene chloride according to the following formula: [31]

$$\underset{\text{(Methylene Chloride)}}{CH_2Cl_2} + 2HF \longrightarrow \underset{\text{(R-32)}}{CH_2F_2} + 2HCl$$

R-125 (1,1,1,2,2-pentafluoroethane) is manufactured by either vapor-phase or liquid-phase catalytic fluorination in a continuous process. The catalysts for vapor phase fluorination are usually chromium oxide or aluminum compounds; antimony pentachloride is used in liquid phase fluorination. One starting chlorine compound for vapor phase hydrofluorination is tetrachloroethylene, also known as perchloroethylene or "PCE," which is used in the presence of a chromium-oxide catalyst. Another starting compound for hydrofluorination is trichloroethylene, or TCE.[32]

R-143a (1,1,1-trifluoroethane) is produced through the hydrofluorination of 1,1,1-trichloroethane (methyl chloroform). R-143a (1,1,1-trifluoroethane) is produced through the hydrofluorination of 1,1,1-trichloroethane (methyl chloroform). In an iterative process, the chlorine atoms are replaced with fluorine atoms.[33] HCFC-141b and HCFC-142b, intermediate steps in this production process, are ozone-depleting substances that are no longer made in developed countries.[34]

$$\underset{\text{(Methyl Chloroform)}}{CH_3\text{-}CCl_3} + 3HF \longrightarrow \underset{\text{(R-143a)}}{CH_3\text{-}CF_3} + 3HCl$$

The production process of R-134a, an out-of-scope HFC component, is documented in the USITC publication for those investigations.[35]

The blending process used to transform component HFCs into blends is not as capital intensive as the process to produce component HFCs. Unlike the manufacture of the individual

[31] Petition, p. 15.
[32] Petition, p. 15.
[33] Petition, p. 16.
[34] Chemical Economics Handbook, *Fluorocarbons*, February 2014, pp. 34-35.
[35] *1,1,1,2-Tetrafluoroethane from China*, Inv. Nos. 701-TA-509 and 731-TA-1244 (Final), USITC Publication 4503, December 2014, pp. I-7 to I-9 and *1,1,1,2-Tetrafluoroethane (R-134a) from China*, Inv. No. 731-TA-1313 (Preliminary), USITC Publication 4606, April 2016, pp. I-6 to I-8.

component HFCs, blending HFCs does not require a chemical reaction, involve substantial energy or labor inputs, or generate by-products.[36]

Commercial manufacturing of HFC blends involves large-scale mixing of component HFCs in precise quantities under controlled pressure for a specific period of time. To blend R-410A, for example, R-32 and R-125 are piped from separate tanks into a blending tank. The HFC with the lowest vapor pressure (e.g., R-32) is typically introduced into the blending tank first. Other component HFCs are then added, progressing from the lowest to the highest vapor pressure. In the case of R-410A, the blending tank produces a uniform blend of the R-32 and R-125 in prescribed proportions, i.e., 50/50. The blend is continuously recirculated in the blending tank for a period of time. A liquid sample is drawn and analyzed in a laboratory. If the analysis is within the specification, the blend is ready for packaging. If not, additional HFC components are added as necessary.[37]

DOMESTIC LIKE PRODUCT ISSUES

Petitioners contend that the domestic like product should be defined as all HFC blends and single HFC components co-extensive with the scope, excluding R-134a and all out-of-scope blends.[38] Petitioners also argue that blenders like National who rely primarily on imported HFC components should be excluded from the domestic industry.[39] Respondent National argues that HFC components and HFC blends are separate like products using either the Commission's semifinished product analysis or the Commission's traditional six factor like product analysis and that blenders are part of the domestic industry.[40] Respondent ICOR argued that in-scope component R-125 should be a separate like product, noting that there is insufficient R-125 production in the United States to supply domestic demand.[41] Chinese respondents agreed with respondent National's argument that HFC components and HFC blends are separate like products. Chinese respondents also argue that R-134a should be excluded from the domestic like product and that blenders and out-of-scope blends should be included in the domestic industry.[42] [43]

In the preliminary phase of this investigation, the Commission disagreed with National's argument that the traditional six factor domestic like product analysis should be used to

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[36] Petition, p. 34.

[37] Petition, p. 16.

[38] Petition, p. 29, petitioners' postconference brief, p. 4, petitioners' prehearing brief, pp. 9-21, and petitioners' posthearing brief, p. 7.

[39] Petitioners' prehearing brief, p. 22 and petitioners' posthearing brief, p. 6.

[40] National's postconference brief, p. 6 and 20, National's prehearing brief, pp. 6-32, and National's posthearing brief, p. 7.

[41] ICOR's prehearing brief, pp. 4-9.

[42] Chinese respondents postconference brief, p. 9.

[43] Respondent Daikin America also agreed with respondent National's argument that HFC components and HFC blends are separate like products. Daikin America did not submit prehearing or posthearing briefs in the final phase of this investigation. Daikin America's postconference brief, p. 2.

determine whether HFC components are the same like product as HFC blends, noting that "the Commission generally applies its six-factor analysis to products at the same level of processing" and that "nearly all HFC components are used as an intermediate product in the production of HFC blends."[44] Based on the record in the preliminary phase of this investigation, the Commission's semifinished product factors "did not warrant finding HFC components and blends to be distinct domestic like products" and the Commission found "a single domestic like product to include all HFC components and blends within the scope of investigation." [45]

IN-SCOPE PRODUCTS: COMPONENTS COMPARED TO BLENDS

The Commission's decision regarding the appropriate domestic product(s) that are "like" the subject imported product is based on a number of factors including: (1) physical characteristics and uses; (2) common manufacturing facilities and production employees; (3) interchangeability; (4) customer and producer perceptions; (5) channels of distribution; and (6) price. Information regarding these factors is discussed below for in-scope components compared to in-scope blends.

Physical characteristics and uses

Refrigerants need to be nontoxic, noncorrosive, nonflammable, and preferably have a low vapor pressure. The uses of a refrigerant are also somewhat limited and determined by the state (liquid versus gas) of the compound at the prevailing conditions.

HFCs are a class of man-made chemical components that contain fluorine, carbon and hydrogen atoms. These compounds have the chemical formula $C_nH_xF_{(2n+2-x)}$ where $1<n<6$. HFC blends are mixtures of two or more single HFC components. The in-scope products are colorless, odorless gases that are hydrophobic. The five in-scope blends are the major commercial refrigerant blends sold in the U.S. market for use in stationary air conditioning and refrigeration applications. These products consist of various blends of the three in-scope single component refrigerants identified above and, in three cases, out-of-scope component, R-134a.

The composition of each in-scope blend, by weight of HFC components, is shown in table I-2. The allowable composition may vary by plus-or-minus two percent from the nominal composition.

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[44] In a semifinished product analysis, the Commission currently examines: 1) whether the upstream article is dedicated to the production of the downstream article or has independent uses; 2) whether there are perceived to be separate markets for the upstream and downstream articles; 3) differences in the physical characteristics and functions of the upstream and downstream articles; 4) differences in the costs or value of the vertically differentiated articles; and 5) significance and extent of the processes used to transform the upstream into the downstream articles. *Hydrofluorocarbon Blends and Components from China: Investigation No. 731-TA-1279 (Preliminary),* USITC Publication 4558, August 2015, p. 7.

[45] *Hydrofluorocarbon Blends and Components from China: Investigation No. 731-TA-1279 (Preliminary),* USITC Publication 4558, August 2015, p. 9.

Table I-2
HFC: Composition of in-scope blends, by HFC component, by nominal weight

Item	R-404A	R-407A	R-407C	R-410A	R-507A
Primary HFC components.--					
R-32	--	20%	23%	50%	--
R-125	44%	40%	25%	50%	50%
R-143a	52%	--	--	--	50%
In-scope components	96%	60%	48%	100%	100%
R-134a[1]	4%	40%	52%	--	--

[1] This is an out-of-scope HFC component that is used to make three of five in-scope blends.

Source: AHRI Standard 700-2012, Table 2A, Petition, p. 13 and exh. I-4.

In-scope blends were developed to succeed HCFCs as the refrigerant in residential and commercial air conditioning and refrigeration applications. HCFCs cause ozone depletion and have been phased out of original equipment applications pursuant to the Montreal Protocol.[46] HFCs were developed as a replacement that would not deplete the ozone layer. The near-azeotropic[47] HFC blends, including R-404A, R-407A, R-407C, and R- 410A, were principally developed to replace R-22. The azeotropic[48] in-scope blend, R-507A, was likewise developed as a replacement for HCFCs, such as R-22.

In-scope blends share key properties that enable their use in air conditioning and refrigeration applications as replacements for HCFCs. In-scope blends are nonflammable, nontoxic, noncorrosive, and recyclable.[49] These properties allow for efficient, safe commercial use in air conditioning and refrigeration systems. The in-scope blends are excellent low- and medium temperature refrigerants. The blends do not cause ozone depletion, although they do

[46] R-22 continues to be used in the replacement market, but that use will also be phased out by 2020, after which only recycled R-22 will be available to the replacement market. Petition, p. 13.

[47] Near azeotrope - A mixture made up of two or more refrigerants with different boiling points that, when in a totally liquid or vapor state, act as one component. However, when changing from vapor to liquid or liquid to vapor, the individual refrigerants evaporate or condense at different temperatures. Near-azeotropic mixtures have a temperature glide of less than 10° F and should be charged in the liquid state to assure proper mixture (non-azeotropic) composition. Retrieved from http://www.refrigerants.com/terminology.htm on July 29, 2015.

[48] An "azeotropic" blend is a "liquid mixture of two or more substances which behaves like a single substance in that the vapor produced by partial evaporation of liquid has the same composition as the liquid." R.J. Lewis, *Hawley's Condensed Chemical Dictionary*, at 103 (14th ed., 2001). Petition, p. 14.

[49] Petition, p. 14.

have a potentially high global warming potential ("GWP")[50] if the refrigerants leak into the atmosphere.[51]

In-scope blends are suitable for use in low- to medium-temperature refrigeration, including residential and certain commercial air conditioning applications, and commercial, transport and some process refrigeration applications. All of the in-scope blends are replacements for HCFCs, particularly R-22. In the large majority of new residential and commercial air conditioning systems, R-410A has replaced R-22. In commercial refrigeration applications, existing equipment is typically retro-fitted to use R-404A, R-407C or other HFC blends in lieu of R-22.[52]

Manufacturing facilities and production employees

Each in-scope single component requires a separate production facility[53] while various in-scope blends can be manufactured using the same facility and employees. According to both petitioners and respondents, the capital investment required and the expertise of the personnel to blend the HFC components can be relatively minimal compared to the capital investment and expertise necessary for an HFC single component facility.[54] While the investment required to produce the individual components can be hundreds of millions of dollars,[55] a blending facility can be constructed for anywhere between $1 million[56] to $*** million. Table I-3 presents responses by U.S. producers on the capital investment necessary to operate in-scope component, blending, and reclamation facilities.

Table I-3
HFC: U.S. producers' comparison of capital investments for in-scope components, blending, and reclamation facilities

* * * * * * *

[50] GWP is a measure of how much energy the emissions of one ton of a gas will absorb over a given period of time, relative to the emissions of one ton of carbon dioxide. Carbon dioxide, as the reference gas, has a GWP of one. The time period usually used for GWPs is 100 years. "Understanding Global Warming Potentials," U.S. EPA, https://www3.epa.gov/climatechange/ghgemissions/gwps.html (accessed May 19, 2016).

[51] Petition, p. 14.

[52] Petition, pp. 14-15.

[53] One U.S. producer, ***, reported being able to switch production from in-scope HFC components to an out-of-scope HFC component, ***.

[54] Respondent National stated that the expertise required to test, maintain, and dispense these products was somewhat more involved but then acknowledged that repackaging distributors would also have to perform these same functions even without blending. Conference transcript, pp. 181-182 (Beatty).

[55] Conference transcript, p. 30 (Sassano).

[56] Conference transcript, p. 49 (Clark) and p.151 (Ponder).

Interchangeability

In-scope components are not typically interchangeable with in-scope blends due to their different chemical, thermodynamic, or safety properties. [57] In-scope blends were created to be generally more stable and less flammable chemical gases for refrigeration applications.

Customer and producer perceptions

The three in-scope components are "used almost exclusively in HFC blends" because these components were "created and exist today for the HFC blends market."[58] The in-scope blends, not the HFC components, are perceived to be the replacement for previous generation refrigerants such as CFCs and HCFCs as a cooling agent in the U.S. refrigeration and air conditioning market.

Channels of distribution

As indicated in table I-4, *** percent of the three in-scope components are internally consumed to produce in-scope blends. The in-scope blends are mostly sold to distributors and service centers (***) and original equipment manufacturers ("OEM") (***) percent.

Table I-4
HFC: U.S. producers' U.S. shipments of individual in-scope blends and in-scope components by shipment type and channel, 2015

* * * * * * *

Price

In-scope blends are typically priced higher than in-scope components, with the exception of R-125. The shortage for R-125 occurred in 2011 and 2012, and there was a "hangover effect" from an R-125 shortage that may have affected the price for R-125 during the period of investigation.[59]

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[57] One HFC component, R-32, was recently approved for use directly in the market even though it contains flammable properties. R-32 is "part of an effort in the past 3-4 years to get the A2L ASHRAE classification adopted into the three model building codes." This code is revised every three years and the "prevailing opinion in the industry is that the 2018 revision cycle might include approval for R-32 as a stand-alone refrigerant." Respondent National's postconference brief, exh. 1, pg. 8. The EPA approved the use of R-32 in "some self-contained air conditioning units" in February 2015. Conference transcript, pp. 157-158 (Beatty).

[58] Conference transcript, p. 28 (Sassano) and hearing transcript, p. 54 (Sassano).

[59] Hearing transcript, p. 168 (Dougan), p. 21 (Beatty) and National's posthearing brief, p. A-1.

INTERMEDIATE PRODUCTS: IN-SCOPE COMPONENTS COMPARED TO IN-SCOPE BLENDS

The Commission's analysis regarding semifinished and finished products is based on the following five factors: (1) whether the upstream article is dedicated to the production of the downstream article or has independent uses; (2) whether there are perceived to be separate markets for the upstream and downstream articles; (3) differences in the physical characteristics and functions of the upstream and downstream articles; (4) differences in the costs or value of the vertically differentiated articles; and (5) significance and extent of the processes used to transform the upstream into the downstream articles. In-scope components are intermediate products used in the production of in-scope blends.

(1) Uses: The three in-scope components that make up the semifinished product analysis are used primarily as ingredients for the five in-scope blends and not typically sold separately in the U.S. market.[60] The five in-scope blends account for 97 percent of commercial refrigerant blends sold in the U.S. market for use in stationary air conditioning and refrigeration applications.[61] Table I-5 presents responses by U.S. producers and U.S. purchasers on the differences in usage of in-scope products.

[60] The fourth HFC component, R-134a, necessary to make three out of five in-scope HFC blends, is not subject to this investigation. This out-of-scope component R-134a is sold directly to end users, mainly for use in car air conditioning systems.

[61] Other refrigeration blends, including patented and proprietary, that are not subject to this investigation account for approximately three percent of the HFC market in the United States. Hearing transcript, pp. 54-56 (Sassano).

Table I-5

HFC: U.S. producers' and U.S. purchasers' responses to the semi-finished product question concerning uses

Item	U.S. producers		U.S. purchasers		U.S. producers and purchasers	
	No	Yes	No	Yes	No	Yes
R-32: Uses other than in in-scope blend production	5	4	---	---	5	4
R-125: Uses other than in in-scope blend production	5	3	1	1	6	4
R-143a: Uses other than in in-scope blend production	5	2	2	---	7	2
U.S. producers on R-32 vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	1	---	***			
***	1	---	***			
***	1	---	***			
***	---	1	***			
***	---	1	***			
***	---	1	***			
***	---	1	***			
All other producers, no narrative	1	---				
U.S. producers: R-32: Uses other than in HFC blend production	5	4				
U.S. purchasers on R-32 vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	---	1	***			
***	---	1	***			
***	---	1	***			
All other purchasers, no narrative	1	---				
Adjusted U.S. purchasers: R-32: Uses other than in in-scope blend production	1	3				
U.S. producers on R-125 vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	1	---	***			
***	1	---	***			
***	1	---	***			
***	---	1	***			
***	---	1	***			
***	---	1	***			
All other producers, no narrative	2	---				
U.S. producers: R-125: Uses other than in in-scope blend production	5	3				
U.S. purchasers on R-125 vs blends	**No**	**Yes**	**Narrative explanations**			
***	---	1	***			
All other purchasers, no narrative	1	---				
Adjusted U.S. purchasers: R-135: Uses other than in HFC blend production	1	1				
U.S. producers on R-143a vs blends	**No**	**Yes**	**Narrative explanations**			
***	---	1	***			
***	---	1	***			
All other producers, no narrative	5	---				
U.S. producers: R-143a: Uses other than in in-scope blend production	5	2				
U.S. purchasers on R-143a vs blends	**No**	**Yes**	**Narrative explanations**			
All other purchasers, no narrative	2	---				
Adjusted U.S. purchasers: R-143a: Uses other than in in-scope blend production	2	---				

Note.--Adjusted purchaser data removes information submitted by firms in their U.S. producers' questionnaire.

Source: Compiled from data submitted in response to Commission questionnaires.

(2) Markets: The three in-scope HFC components are not usually sold for use as a single component.[62] They are swapped and sold to HFC blenders for production of the downstream in-scope blends. Table I-6 presents detailed responses by U.S. producers and U.S. purchasers on market differences between in-scope components and blends.

Table I-6

HFC: U.S. producers' and U.S. purchasers' responses to the semi-finished product question concerning markets of in-scope HFC components vs in-scope HFC blends

Item	U.S. producers		U.S. purchasers		U.S. producers and purchasers combined	
	No	Yes	No	Yes	No	Yes
R-32: Differences in markets	3	4	1	---	4	4
R-125: Differences in markets	3	4	---	---	3	4
R-143a: Differences in markets	4	2	---	1	4	3
U.S. producers on R-32 vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	---	1	***			
***	---	1	***			
***	---	1	***			
All other producers, no narrative	3	1				
U.S. producers: R-32: Differences in markets	3	4				
U.S. purchasers on R-32 vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	1	---	***			
All other purchasers, no narrative	---	---				
Adjusted U.S. purchasers: R-32: Differences in markets	1	---				
U.S. producers on R-125 vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	1	---	***			
***	---	1	***			
***	---	1	***			
***	---	1	***			
All other producers, no narrative	2	1				
U.S. producers: R-32: Differences in markets	3	4				
U.S. purchasers on R-125 vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
All other purchasers, no narrative	---	---				
Adjusted U.S. purchasers: R-125: Difference in markets	---	---				
U.S. producers on R-143a vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	---	1	***			
All other producers, no narrative	4	1				
U.S. producers: R-143a: Differences in markets	4	2				
U.S. purchasers on R-143a vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	---	1	***			
All other purchasers, no narrative	---	---				
Adjusted U.S. purchasers: R-134a: Difference in markets	---	1				

Note.--Adjusted purchaser data removes information submitted by firms in their U.S. producers' questionnaire (***).

Source: Compiled from data submitted in response to Commission questionnaires.

[62] One HFC component, R-32, has been approved by the EPA in February 2015 for use in "some self-contained air conditioning units". Conference transcript, pp. 157-158 (Beatty).

(3) Characteristics and functions: There are physical differences between the semifinished in-scope components and the downstream in-scope blends. The handling of the finished in-scope blends is different from that required for the semifinished in-scope components. If the proper conditions are not maintained for the in-scope blends, then the various components may separate, changing the composition of the blend. The same is true when some of the in-scope blends are withdrawn from a larger container for use in an application. The person extracting the in-scope blend must test the product to make sure that it still meets the specifications for that blend. These actions are not necessary for an individual component because, as a single compound, it cannot separate.[63] Additionally, the in-scope blends are not flammable, making them suitable for use as refrigerants. Two of the in-scope components, on the other hand, are flammable and require the appropriate safety precautions.[64] Table I-7 presents detailed responses by U.S. producer and U.S. purchasers on the differences between characteristic and functions of in-scope components and blends.

Table I-7

HFC: U.S. producers' and U.S. purchasers' responses to the semi-finished product question concerning characteristics and functions of in-scope components vs in-scope blends

Item	U.S. producers		U.S. purchasers		U.S. producers and purchasers combined	
	No	Yes	No	Yes	No	Yes
R-32: Differences in physical characteristics	---	8	---	3	---	11
R-125: Differences in physical characteristics	1	6	1	1	2	7
R-143a: Differences in physical characteristics	---	7	1	2	1	9
U.S. producers on R-32 vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	---	1	***			
***	---	1	***			
***	---	1	***			
***	---	1	***			
***	---	1	***			
***	---	1	***			
***	---	1	***			
***	---	1	***			
All other producers, no narrative	---	---				
U.S. producers: R-32: Differences in physical characteristics	---	8				
U.S. purchasers on R-32 vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	---	1	***			
***	---	1	***			
***	---	1	***			
All other purchasers, no narrative	---	---				
Adjusted U.S. purchasers: R-32: Differences in physical characteristics	---	3				

Tabled continued.

[63] Conference Transcript, p. 95 (Clark, Irani).

[64] Hearing transcript, p. 25 (Sassano) and conference transcript, p. 137 (Goldfeder).

Table I-7--*Continued*

HFC: U.S. producers' and U.S. purchasers' responses to the semi-finished product question concerning characteristics and functions of in-scope HFC components vs in-scope HFC blends

U.S. producers on R-125 vs in-scope blends	No	Yes	Narrative explanations
***	---	1	***
***	---	1	***
***	---	1	***
***	---	1	***
***	---	---	***
***	---	1	***
All other producers, no narrative	1	1	
U.S. producers: R-125: Differences in physical characteristics	1	6	
U.S. purchasers on R-125 vs in-scope blends	**No**	**Yes**	**Narrative explanations**
***	---	1	***
All other purchasers, no narrative	1	---	
Adjusted U.S. purchasers: R-125: Differences in physical characteristics	1	1	
U.S. producers on R-143a vs in-scope blends	**No**	**Yes**	**Narrative explanations**
***	---	1	***
***	---	1	***
***	---	1	***
***	---	1	***
***	---	1	***
***	---	1	***
All other producers, no narrative	---	1	
U.S. producers: R-143a: Differences in physical characteristics	---	7	
U.S. purchasers on R-143a vs in-scope blends	**No**	**Yes**	**Narrative explanations**
***	---	1	***
All other purchasers, no narrative	1	1	
Adjusted U.S. purchasers: R-143a: Differences in physical characteristics	1	2	

Note.--Adjusted purchaser data removes information submitted by firms in their U.S. producers' questionnaire (duplicative data).

Source: Compiled from data submitted in response to Commission questionnaires.

(4) Price or Value: In-scope HFC components are purchased in the spot market and/or swapped by individual HFC component producers for use in the downstream production of HFC blends. The downstream products (in-scope HFC blends) typically possess a higher unit value than the upstream/semifinished product (in-scope HFC components), with the exception of in-scope HFC component R-125. Table I-8 and figure I-1 present responses of U.S. producers and U.S. purchasers on value or price differences between in-scope HFC components and blends. For the ratios showing the cost of goods sold, please see the *Value Added* section of *Part VI*.

Table I-8

HFC: U.S. producers' and U.S. purchasers' responses to the semifinished product question concerning value or price differences of in-scope components vs in-scope blends

Item	U.S. producers		U.S. purchasers		U.S. producer and purchasers combined	
	No	Yes	No	Yes	No	Yes
R-32: Differences in price or value	4	4	---	4	4	8
R-125: Differences in price or value	5	3	---	4	5	7
R-143a: Differences in price or value	4	2	---	3	4	5
U.S. producers on R-32 vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	1	---	***			
***	---	1	***			
***	---	1	***			
***	---	1	***			
All other producers, no narrative	3	1				
U.S. producers: R-32: Differences in price or value	4	4				
U.S. purchasers on R-32 vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	---	1	***			
***	---	1	***			
***	---	1	***			
***	---	1	***			
All other purchasers, no narrative	---	---				
Adjusted U.S. purchasers: R-32: Differences in price or value	---	4				
U.S. producers on R-125 vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	1	---	***			
***	---	1	***			
***	---	1	***			
All other producers, no narrative	4	1				
U.S. producers: R-125 Differences in price or value	5	3				
U.S. purchasers on R-125 vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	---	1	***			
***	---	1	***			
***	---	1	***			
All other purchasers, no narrative	---	1				
Adjusted U.S. purchasers: R-125: Differences in price or value	---	4				
U.S. producers on R-143s vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	---	1	***			
***	---	1	***			
All other producers, no narrative	4	---				
U.S. producers: R-143a Differences in price or value	4	2				
U.S. purchasers on R-143s vs in-scope blends	**No**	**Yes**	**Narrative explanations**			
***	---	1	***			
***	---	1	***			
All other purchasers, no narrative	---	1				
Adjusted U.S. purchasers: R-143a: Differences in price or value	---	3				

Note.--Adjusted purchaser data removes information submitted by firms in their U.S. producers' questionnaire (duplicative data).

Source: Compiled from data submitted in response to Commission questionnaires.

Figure I-1

HFC: U.S. producers' high to low average unit values of in-scope commercial shipments by product, 2013-15

* * * * * * *

(5) Transformation processes: As noted earlier in the *Domestic Like Product* section, in-scope blends require additional processing in a facility using equipment different from in-scope single component production. Table I-9 presents detailed responses by U.S. producers and U.S. purchasers regarding the complexity of converting in-scope components to in-scope blends.

Table I-9

HFC: U.S. producers' and U.S. purchasers' responses to the semifinished product question concerning complexity of converting in-scope components to in-scope blends

Item	U.S. producers		U.S. purchasers		U.S. producers and purchasers combined	
	No	Yes	No	Yes	No	Yes
R-32: Extensive process to convert to in-scope blends	5	3	1	1	6	4
R-125: Extensive process to convert to in-scope blends	6	2	2	1	8	3
R-143a: Extensive process to convert to in-scope blends	6	2	1	---	7	2

U.S. producers on R-32 vs in-scope blends	No	Yes	Narrative explanations
***	1	---	***
***	---	1	***
***	---	1	***
***	---	1	***
All other producers, no narrative	4	---	
U.S. producers: R-32: Extensive process to convert to in-scope blends	5	3	

Table continued.

Table I-9--*Continued*
HFC: U.S. producers' and U.S. purchasers' responses to the semifinished product question concerning complexity of converting in-scope components to in-scope blends

U.S. purchasers on R-32 vs in-scope blends	No	Yes	Narrative explanations
***	---	1	***
All other purchasers, no narrative	1	---	
Adjusted U.S. purchasers: R-32: Extensive process to convert to in-scope blends	1	1	
U.S. producers on R-125 vs in-scope blends	**No**	**Yes**	**Narrative explanations**
***	---	1	***
All other producers, no narrative	6	1	
U.S. producers: R-125: Extensive process to convert to in-scope blends	6	2	
U.S. purchasers on R-125 vs in-scope blends	**No**	**Yes**	**Narrative explanations**
All other purchasers, no narrative	2	1	
Adjusted U.S. purchasers: R-125: Extensive process to convert to in-scope blends	2	1	
U.S. producers on R-143a vs in-scope blends	**No**	**Yes**	**Narrative explanations**
***	---	1	***
All other producers, no narrative	6	1	
U.S. producers: R-143a: Extensive process to convert to in-scope blends	6	2	
U.S. Purchasers on R-143a vs in-scope blends	**No**	**Yes**	**Narrative explanations**
All other purchasers, no narrative	1	---	
U.S. purchasers on R-32 vs in-scope blends	**No**	**Yes**	**Narrative explanations**
***	---	1	***
All other purchasers, no narrative	1	---	
Adjusted U.S. purchasers: R-32: Extensive process to convert to in-scope blends	1	1	
U.S. producers on R-125 vs in-scope blends	**No**	**Yes**	**Narrative explanations**
***	---	1	***
All other producers, no narrative	6	1	
U.S. producers: R-125: Extensive process to convert to in-scope blends	6	2	
U.S. purchasers on R-125 vs in-scope blends	**No**	**Yes**	**Narrative explanations**
All other purchasers, no narrative	2	1	
Adjusted U.S. purchasers: R-125: Extensive process to convert to in-scope blends	2	1	
U.S. producers on R-143a vs in-scope blends	**No**	**Yes**	**Narrative explanations**
***	---	1	***
All other producers, no narrative	6	1	
U.S. producers: R-143a: Extensive process to convert to in-scope blends	6	2	
U.S. Purchasers on R-143a vs in-scope blends	**No**	**Yes**	**Narrative explanations**
All other purchasers, no narrative	1	---	
Adjusted U.S. purchasers: R-125: Extensive process to convert to in-scope blends	1	---	

Note.--Adjusted purchaser data removes information submitted by firms in their U.S. producers' questionnaire (duplicative data).

Source: Compiled from data submitted in response to Commission questionnaires.

IN-SCOPE HFC PRODUCTS COMPARED TO OUT-OF-SCOPE R-134A

The Commission's decision regarding the appropriate domestic product(s) that are "like" the subject imported product is based on a number of factors including: (1) physical characteristics and uses; (2) common manufacturing facilities and production employees; (3) interchangeability; (4) customer and producer perceptions; (5) channels of distribution; and (6) price. Information regarding these factors is discussed below for in-scope products (both components and blends) compared to out-of-scope component R-134a.

Physical characteristics and uses

Table I-10 presents the detailed responses by U.S. producers on the physical characteristics and uses of in-scope products compared to out-of-scope R-134a.

Table I-10

HFC: U.S. producers' responses to the like product question concerning the similarity of R-134a's physical characteristics and uses to in-scope products

Item	U.S. producers			
	Fully	Mostly	Somewhat	Not at all
Characteristics and Uses--R-134a vs in-scope components	---	---	2	6
Characteristics and Uses--R-134a vs in-scope blends	---	---	2	6
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			

Source: Compiled from data submitted in response to Commission questionnaires.

Manufacturing facilities and production employees

Table I-11 presents detailed responses by U.S. producers on the manufacturing and employees used to operate of in-scope products compared to out-of-scope R-134a.

Table I-11

HFC: U.S. producers' responses to the like product question concerning R-134a's use of common manufacturing and employees as in-scope products

Item	U.S. producers			
	Fully	Mostly	Somewhat	Not at all
Manufacturing--R-134a vs in-scope components	---	---	2	5
Manufacturing--R-134a vs in-scope blends	---	1	---	6
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			

Source: Compiled from data submitted in response to Commission questionnaires.

Interchangeability

Table I-12 presents U.S producers' responses to the market similarity of in-scope products compared to out-of-scope R-134a.

Table I-12

HFC: U.S. producers' responses to the like product question concerning R-134a's interchangeability with in-scope products

Item	U.S. producers			
	Fully	Mostly	Somewhat	Not at all
Interchangeability--R-134a vs in-scope components	---	---	---	8
Interchangeability--R-134a vs in-scope blends	---	---	1	7
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			

Source: Compiled from data submitted in response to Commission questionnaires.

Customer and producer perceptions

Table I-13 presents U.S producers' responses to the interchangeability of in-scope products compared to out-of-scope R-134a.

Table I-13

HFC: U.S. producers' responses to the like product question concerning the market similarity of R-134a's to in-scope products

Item	U.S. producers			
	Fully	Mostly	Somewhat	Not at all
Market perceptions--R-134a vs in-scope components	---	2	2	3
Market perceptions--R-134a vs in-scope blends	---	2	4	2
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			

Source: Compiled from data submitted in response to Commission questionnaires.

Channels of distribution

Tables I-14 and I-15 present U.S producers' narrative responses and data on the channels of distribution for in-scope products compared to out-of-scope R-134a.

Table I-14

HFC: U.S. producers' responses to the like product question concerning the similarity of R-134a's channels of distribution compared to in-scope products

Item	U.S. producers			
	Fully	Mostly	Somewhat	Not at all
Channels--R-134a vs in-scope components	1	2	2	3
Channels--R-134a vs in-scope blends	1	2	5	---
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			

Source: Compiled from data submitted in response to Commission questionnaires.

Table I-15

HFC: U.S. producers' reported channels of distribution for R-134a compared to in-scope products

* * * * * * *

Price

Table I-16 and figures I-2 and I-3 present U.S producers' responses of the prices of in-scope products compared to out-of-scope R-134a.

Table I-16

HFC: U.S. producers' responses to the like product question concerning the similarity of R-134a's prices compared to in-scope products

Item	U.S. producers			
	Fully	Mostly	Somewhat	Not at all
Price--R-134a vs in-scope components	---	1	2	5
Price--R-134a vs in-scope blends	---	2	2	4
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			

Source: Compiled from data submitted in response to Commission questionnaires.

Figure I-2

HFC: U.S. producers' high to low average unit values of commercial shipments by product, 2013-15

* * * * * * *

Figure I-3

HFC: U.S. producers' price, 2013-15

* * * * * * *

BLENDS: IN-SCOPE BLENDS COMPARED TO OUT-OF-SCOPE REFRIGERANT BLENDS

The Commission's decision regarding the appropriate domestic product(s) that are "like" the subject imported product is based on a number of factors including: (1) physical characteristics and uses; (2) common manufacturing facilities and production employees; (3) interchangeability; (4) customer and producer perceptions; (5) channels of distribution; and (6) price. Information regarding these factors is discussed below for in-scope blends compared to out-of-scope refrigerant blends.

Table I-17 presents data on U.S. producers' production of in-scope blends and out-of-scope blends. Data for in-scope blend production is compiled from six U.S. producers (***) while data for out-of-scope production excludes *** because it did not report any out-of-scope blending production and includes the out-of-scope blending operations of ***. Out-of-scope blend production includes 25 blends of HFC, HCFC/CFC, and HFO, with 23 out of 25 blends using at least one in-scope component.[65] ***. ***.

Table I-17
Blends: U.S. producers' production of in-scope and out-of-scope blends

* * * * * * *

Physical characteristics and uses

Table I-18 presents U.S producers' and U.S. purchasers' responses to the physical characteristics and uses of in-scope blends with out-of-scope refrigerant blends. Out-of-scope refrigerant blends may include HCFCs, CFCs, and hydrofluoroolefins (HFOs).[66] HFO blends are commonly referred to as next generation refrigerant blends that are being developed by the HFC industry to "meet EPA's mandate to lower GWP refrigerants." HFO blends do not have ozone depleting properties and have very low to no GWP.[67] These patented HFO blends are new "green" and sustainable chemical compounds being developed by companies to replace in-scope blends in some applications.[68]

[65] The two out-of-scope blends that do not use at least one in-scope component are: R-409A (***) and R-414B (***), and R-513A.

[66] Conference transcript, p. 106 (Sassano). Ms. Sassano further explained that CFCs and HCFCs are "prior-generation" chlorine-containing compounds and are ozone depleters. The in-scope HFC blends are not ozone depleters, but contribute to global warming.

[67] Hearing transcript, p. 54 (Sassano) and conference transcript, p. 158 (Beatty).

[68] Hearing transcript, p. 152 (Beatty), conference transcript, p. 106 (Irani) and p. 106 (Sassano).

Table I-18

Blends: U.S. producers' and U.S. purchasers' responses to the like product question concerning the similarity of out-of-scope blends' physical characteristics and uses to in-scope blends

Item	U.S. producers			
	Fully	Mostly	Somewhat	Not at all
Characteristics and Uses--Other blends vs in-scope blends	---	---	7	---
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			

Item	Adj U.S. purchasers			
	Fully	Mostly	Somewhat	Not at all
Characteristics and Uses--Other blends vs in-scope blends	1	2	3	---
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			

Note.--Adjusted purchaser data removes information submitted by firms in their U.S. producers' questionnaire (duplicative data).

Source: Compiled from data submitted in response to Commission questionnaires.

Manufacturing facilities and production employees

Table I-19 presents U.S producers' and U.S. purchasers' responses to the manufacturing facilities and production employees for in-scope blends with out-of-scope refrigerant blends.

Table I-19

Blends: U.S. producers' and U.S. purchasers' responses to the like product question concerning out-of-scope blends' use of common manufacturing and employees as in-scope blends

Item	U.S. producers			
	Fully	**Mostly**	**Somewhat**	**Not at all**
Manufacturing--Other blends vs in-scope blends	1	3	2	---
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			
Item	**Adj U.S. purchasers**			
	Fully	**Mostly**	**Somewhat**	**Not at all**
Manufacturing--Other blends vs in-scope blends	---	1	1	---
Firm	**Narrative explanations**			
***	***			

Note.--Adjusted purchaser data removes information submitted by firms in their U.S. producers' questionnaire (duplicative data).

Source: Compiled from data submitted in response to Commission questionnaires.

Interchangeability

Table I-20 presents U.S producers' and U.S. purchasers' responses to the interchangeability of in-scope blends compared to out-of-scope refrigerant blends.

Table I-20

Blends: U.S. producers' and U.S. purchasers' responses to the like product question concerning out-of-scope blends' interchangeability with in-scope blends

Item	U.S. producers			
	Fully	**Mostly**	**Somewhat**	**Not at all**
Interchangeability--Other blends vs in-scope blends	---	---	3	4
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			
Item	**U.S. purchasers**			
	Fully	**Mostly**	**Somewhat**	**Not at all**
Interchangeability--Other blends vs in-scope blends	1	---	5	2
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			

Note.--Adjusted purchaser data removes information submitted by firms in their U.S. producers' questionnaire (duplicative data).

Source: Compiled from data submitted in response to Commission questionnaires.

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Customer and producer perceptions

Table I-21 presents U.S producers' and U.S. purchasers' responses to the market perceptions for in-scope blends and out-of-scope refrigerant blends.

Table I-21

Blends: U.S. producers' and U.S. purchasers' responses to the like product question concerning the market similarity of out-of-scope blends to in-scope blends

Item	U.S. producers			
	Fully	**Mostly**	**Somewhat**	**Not at all**
Market perceptions--Other blends vs in-scope blends	---	---	3	5
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			
Item	**U.S. purchasers**			
	Fully	**Mostly**	**Somewhat**	**Not at all**
Market perceptions--Other blends vs in-scope blends	---	3	5	---
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			

Note.--Adjusted purchaser data removes information submitted by firms in their U.S. producers' questionnaire (duplicative data).

Source: Compiled from data submitted in response to Commission questionnaires.

Channels of distribution

Table I-22 presents U.S producers' and U.S. purchasers' responses to the channels of distribution for in-scope blends and out-of-scope refrigerant blends. Table I-23 presents data on U.S. producers' reported channels of distribution for out-of-scope refrigerant blends compared to in-scope blends.

Table I-22

Blends: U.S. producers' and U.S. purchasers' responses to the like product question concerning the similarity of out-of-scope blends' channels of distribution to in-scope blends

Item	U.S. producers			
	Fully	Mostly	Somewhat	Not at all
Channels--Other blends vs in-scope blends	3	4	---	---
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
Item	**U.S. purchasers**			
	Fully	**Mostly**	**Somewhat**	**Not at all**
Channels--Other blends vs in-scope blends	4	5	2	---
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			

Note.--Adjusted purchaser data removes information submitted by firms in their U.S. producers' questionnaire (duplicative data).

Source: Compiled from data submitted in response to Commission questionnaires.

Table I-23

Blends: U.S. producers' reported channels of distribution for out-of-scope refrigerant blends compared to in-scope blends

* * * * * * *

Price

Table I-24 and figure I-4 present U.S producers' and U.S. purchasers' responses to price differences between in-scope blends and out-of-scope refrigerant blends.

Table I-24

Blends: U.S. producers' and U.S. purchasers' responses to the like product question concerning the similarity of out-of-scope blend prices compared to in-scope blends

	U.S. producers			
Item	**Fully**	**Mostly**	**Somewhat**	**Not at all**
Price--Other blends vs in-scope blends	---	---	1	6
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			
	U.S. purchasers			
Item	**Fully**	**Mostly**	**Somewhat**	**Not at all**
Price--Other blends vs in-scope blends	---	3	4	3
Firm	**Narrative explanations**			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			
***	***			

Note.--Adjusted purchaser data removes information submitted by firms in their U.S. producers' questionnaire (duplicative data).

Source: Compiled from data submitted in response to Commission questionnaires.

Figure I-4

Blends: U.S. producers' high to low average unit values of commercial shipments by product, 2013-15

* * * * * * *

OUT-OF-SCOPE PRODUCT DISCUSSION

More than 50 refrigerant blends use the in-scope components (plus out-of-scope R-134a). Five U.S. producers (***) reported the ability to make out-of-scope blends using the same machinery and equipment as in-scope blends. One additional out-of-scope U.S. producer, ***, also reported producing two out-of-scope HFC blends (R-421A and R-421B) that are under patent and excluded from the scope.

Table I-25 presents information on the composition of select refrigerant blends, only a handful of which are in the scope of this investigation. A number of the blends not in the scope of this investigation were positively identified as “excluded HFC blends” in the scope language, either by their blend designation or by a company-specific trademark. The blends expressly excluded from the scope are identified by an asterisk.

Table I-25
Blends: Component inputs by weight

HFC blends	Component input by weight					Note
	R-32	R-125	R-143a	R-134a[1]	Other	
In-scope HFC blends:						
R-404A		44%	52%	4%		
R-407A	20%	40%		40%		
R-407C	23%	25%		52%		
R-410A	50%	50%				
R-507A		50%	50%			
Out-of-scope HFC blends that contain exclusively in-scope components and R-134a:						
R-407B	10%	70%		20%		
R-407D	15%	15%		70%		***
R-407E	25%	15%		60%		
R-407F*	30%	30%		40%		***
R-410B	45%	55%				
R-421A*		58%		42%		Produced by Choice Refrigerants ***; under patent; New ERA group, includes a proprietary additional "unidentified lubricant"
R-421B*		85%		15%		Produced by Choice Refrigerants ***; under patent
R-427A	15%	25%	10%	50%		***
Out-of-scope HFC blends that contain some in-scope components and/or R-134a, but also other chemicals:						
R-413A				88.0%	12.0%	R-218: 9.0%; R-600a: 3.0%
R-417A*		46.6%		50.0%	3.4%	R-600: 3.4%; ***
R-417B		79.0%		18.3%	2.7%	R-600: 2.7%
R-417C		19.5%		78.8%	1.7%	R-600: 1.7% ***
R-419A		77.0%		19.0%	4.0%	R-E170: 4.0%
R-419B		48.5%		48.0%	3.5%	R-E170: 3.5%
R-422A*		85.1%		11.5%	3.4%	R-600a: 3.4%; ***
R-422B		55.0%		42.0%	3.0%	R-600a: 3.0% ***
R-422C		82.0%		15.0%	3.0%	R-600a: 3.0% ***
R-422D*		65.1%		31.5%	3.4%	R-600a: 3.4%; ***
R-422E		58.0%		39.3%	2.7%	R-600a: 2.7% ***
R-423A				52.5%	47.5%	R-227ea: 47.5%
R-424A		50.5%		47.0%	2.5%	R-600a: 0.9%; R-600: 1.0%; R-601a: 0.6% ***
R-425A	18.5%			69.5%	12.0%	R-227ea: 12.0%
R-426A		5.1%		93.0%	1.9%	R-600: 1.3%; R-601a: 0.6%
R-428A		77.5%		20.0%	2.5%	R-290: 0.6%; R-600a: 1.9%
R-434A		63.2%	18.0%	16.0%	2.8%	R-600a: 2.8%
R-437A*		19.5%		78.5%	2.0%	R-600: 1.4%; R-601: 0.6%; ***
R-438A*	8.5%	45.0%		44.2%	2.3%	R-600: 1.7%; R-601a: 0.6%; ***
R-439A	50.0%	47.0%			3.0%	R-600a: 3.0%
R-440A				1.6%	98.4%	R-290: 0.6%; R-152a: 97.8%
R-442A	31.0%	31.0%		30.0%	8.0%	R-152a: 3.0%; R-227ea: 5.0%
R-512A				5.0%	95.0%	R-152a: 95.0%

Table continued on next page.

Table I-25--*Continued*
Blends: Component inputs by weight

HFC blends	Component input by weight					Note
	R-32	R-125	R-143a	R-134a[1]	Other	
Out-of-scope HCFCs/CFCs:						
R-401A					100.0%	R-22: 53%; R-152a: 13%; R-124: 34%; ***
R-401B					100.0%	R-22: 61%; R-152a: 11%; R-124: 28%; ***
R-402A		60.0%			40.0%	R-22: 38%; R-290 (Propane): 2% ***
R-402B		38.0%				R-22: 60%; R-290 (Propane): 2% ***
R-408A		7.0%	46.0%		47.0%	R-22: 47.0%; ***; ***
R-409A					100.0%	R-22: 60%; R-142b: 15%; R-124: 25%; ***
R-412A					100.0%	R-22: 70%; R-218: 5%; R-142b: 25%
R-414B					100.0%	R-22: 50%; R-124: 39%; R-142b: 9.5%; R-600a (Isobutane): 1.5%; ***
R-416A				59.0%	41.0%	R-124: 39.5%; R-600: 1.5% ***
R-420A				88.0%	12.0%	R-142b: 12.0% ***
R-453A	20.0%	20.0%		53.8%	6.2%	R-227ea: 5.0%; R-600a: 0.6%; R-601a 0.6%
R-504	48.2%				51.8%	R-115: 51.8%
Out-of-scope HFOs:						
R-444A	12.0%				88.0%	R-152a: 5.0%; R-1234ze: 83.0%
R-445A				9.0%	91.0%	R-744: 6.0%; R-1234ze: 85.0%
R-448A	26.0%	26.0%		21.0%	27.0%	R-1234yf: 20.0%; R-1234ze: 7.0% ***
R-449A	24.3%	24.7%		25.7%	25.3%	R-1234yf: 25.3%; ***
R-449B	25.2%	24.3%		27.3%	23.2%	R-1234yf: 23.2%
R-450A				42.0%	58.0%	R-1234ze: 58.0% ***
R-451A				10.2%	89.8%	R-1234yf: 89.8%
R-451B				11.2%	88.8%	R-1234yf: 88.8%
R-452A	11.0%	59.0%			30.0%	R-1234yf: 30.0%
R-454A	35.0%				65.0%	R-1234yf: 65.0%
R-454B	68.9%				31.1%	R-1234yf: 31.1%
R-513A				44.0%	56.0%	R-1234ze: 56.0%; ***

[1] R-134a is not an in-scope HFC component, but it is used as an ingredient in blending three out of five of the in-scope HFC blends.

Note.—Blends identified with asterisks are positively identified exclusions based on Commerce's scope.

Source: ASHRAE Standard 34-2013, https://www.ashrae.org/standards-research--technology/standards--guidelines/standards-activities/ashrae-refrigerant-designations (accessed July 23, 2015); ASHRAE Standard 34-2013, Addenda, Supplement 2015, https://www.ashrae.org/standards-research--technology/standards-addenda (accessed July 7, 2016); data submitted in response to Commission questionnaires; ***'s and http://www.refrigerants.com (accessed July 7, 2016).

PART II: CONDITIONS OF COMPETITION IN THE U.S. MARKET

U.S. MARKET CHARACTERISTICS

HFCs were developed to replace chlorofluorocarbons (CFCs) and hydro chlorofluorocarbons (HCFCs) in low- and medium- temperature refrigeration and air-conditioning applications as these were being phased out due to environmental-impact concerns. HFC blends are used in residential air conditioning and heat pumps and in commercial air-conditioning, particularly decentralized systems with less than 100 tons in capacity. Additionally, HFC blends are used in commercial refrigeration, such as supermarket display and walk-in coolers; transportation refrigeration; and process refrigeration.[1]

Most in-scope HFC components are used in the production of HFC blends, which are composed of differing ratios of HFC components.[2] Petitioners indicated that most in-scope HFC components are used in HFC blends, with small amounts of components sold for other end uses; specifically, R-125 can also be used in fire suppression systems. Blender and importer National reported that R-125 can be used in smelting applications, in foam blowing and in certain medical equipment using non-flammable inert pressurized gas. National added that both R-125 and R-32 can be used in semiconductor silicon wafer manufacturing for etching silicon.[3] Petitioners reported that R-32 is used in China and Japan as an independent refrigerant in residential air conditioning systems, but has not been fully approved for this use in the United States.[4] National indicated that R-32 is expected to be fully developed for use in the United States in a "few years," instead of the 8-10 years that was suggested by Petitioners.[5]

The Commission received questionnaire responses from six domestic producers of in-scope HFC components and/or blends.[6] Three of these firms (Arkema, Chemours, and Honeywell) produce both components and blends, while three (Hudson, ICOR, and National) produce only blends. All three domestic HFC component producers internally consume HFC

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[1] Petition, pp. 1-2 and 18-19.

[2] Petition, p. 20.

[3] Respondent National's postconference brief, p. 8.

[4] Petition, p. 20 and conference transcript, pp. 51- 52 (Clark).

[5] R-32 has been approved for use even though it has flammable properties. R-32 is "part of an effort in the past 3-4 years to get the A2L ASHRAE classification adopted into the three model building codes." This code is revised every three years and the "prevailing opinion in the industry is that the 2018 revision cycle might include approval for R-32 as a stand-alone refrigerant." Respondent National's postconference brief, exh. 1, p. 8. The EPA approved the use of R-32 in "some self-contained air conditioning units" in February 2015. Conference transcript, pp. 157-158 (Beatty) and conference transcript, pp. 51- 52 (Clark).

[6] The Commission received a total of 11 questionnaires from U.S. producers of refrigerant blends and components. Not all 11 U.S. producers responded to all questions in the U.S. producers' questionnaires. Data in Part II reflect the responses from all eleven U.S. producers' questionnaires (if the U.S. producers responded) unless otherwise noted. See a detailed description on the activity of all 11 U.S. producers in Market Summary section in Part 1.

components, engage in swapping arrangements with other HFC component producers, and import HFC components to produce HFC blends. They also sell HFC components to HFC blenders.

Apparent U.S. consumption of HFC blends and components increased from 2013 to 2015. Overall, apparent U.S. consumption in 2015 was *** percent higher than in 2013.

U.S. PURCHASERS

The Commission received 24 usable questionnaire responses from firms that bought in-scope HFC blends and components since January 2013.[7] Of these 24 purchasers, five reported being in-scope HFC components purchasers and 20 reported being in-scope HFC blend purchasers. Of the 24 responding purchasers, 19 purchased domestic HFC blends and components, nine purchased imports of the subject merchandise from China, and one purchased imports of HFC blends and components from other sources. Fourteen responding purchasers are distributors, four are blenders, two (Trane and National Refrigeration and A/C products) are original equipment manufacturers and one (***) reported being a reclaimer.[8] In 2015, the largest reported purchasers of HFC components were Chemours and National and the largest reported purchasers of HFC blends were United Refrigeration, Trane, and Airgas.

CHANNELS OF DISTRIBUTION

U.S. producers sold HFC components *** to blenders/repackers and *** sales of HFC blends *** and *** during 2013-15, as shown in table II-1. Distribution for HFC component imports from China fluctuated between distributors and/or equipment owners and blenders/repackers. Shipments of HFC components imported from China were split between distributors and/or equipment owners and blenders/repackers in 2013, were almost exclusively to distributors and/or equipment owners in 2014, and were almost exclusively to blenders/repackers in 2015. HFC blend imports from China were *** sold to distributors and/or equipment owners.

Table II-1
HFC blends and components: U.S. producers' and U.S. importers' channels of distribution, 2013-15

* * * * * * *

[7] Data for Part II reflect the responses from all 24 purchasers' questionnaires (if the U.S. purchasers responded) unless otherwise noted.

[8] Purchaser *** also reported being a distributor. Purchaser *** reported that it purchases HFC blends for use in trucks as refrigerants. Purchaser *** did not report business type. Purchaser *** reported being an end user.

GEOGRAPHIC DISTRIBUTION

U.S. producers and importers reported selling HFC blends and components to all regions in the United States (table II-2). For U.S. producers, *** percent of sales were within 100 miles of their production facilities, *** percent were between 101 and 1,000 miles, and *** percent were over 1,000 miles. Importers sold *** percent within 100 miles of their U.S. points of shipment, *** percent between 101 and 1,000 miles, and *** percent over 1,000 miles.

Table II-2

HFC blends and components: Geographic market areas in the United States served by U.S. producers and importers

Region	U.S. producers	U.S. importers of product from China
Northeast	8	10
Midwest	8	8
Southeast	8	11
Central Southwest	7	11
Mountains	7	8
Pacific Coast	7	7
Other[1]	4	4
All regions (except Other)	7	7
Reporting firms	8	13

[1] All other U.S. markets, including AK, HI, PR, and VI.

Source: Compiled from data submitted in response to Commission questionnaires.

SUPPLY AND DEMAND CONSIDERATIONS

U.S. supply

Domestic production

Based on available information, U.S. HFC producers have the ability to respond to changes in demand with moderate-to-large changes in the quantity of shipments to the U.S. market. The main contributing factors to this degree of responsiveness of supply are available capacity, the high level of exports, and increasing inventories.

Industry capacity

Domestic capacity utilization[9] for HFC components fluctuated slightly, but decreased overall, from *** percent in 2013 to *** percent in 2015. Both HFC component production capacity and production decreased over the period of investigation,[10] driven by the decrease in capacity and production of ***.[11] This moderate level of capacity utilization suggests that U.S. producers may be able to increase production of HFC components in response to an increase in prices.

Domestic capacity utilization for HFC blends increased from *** percent in 2013 to *** percent in 2014.[12] Both HFC blend production capacity and production increased over the period of investigation. This low level of capacity utilization suggests that U.S. producers may have the ability to increase production of HFC blends in response to an increase in prices.

Alternative markets

U.S. producers' exports of components, as a percentage of total shipments, decreased from *** percent in 2013 to *** percent in 2015. U.S. producers' exports of blends, as a percentage of total shipments, fluctuated but decreased overall from *** percent in 2013 to *** percent in 2014 to *** percent in 2015. The high level of export shipments indicates that U.S. producers may have some ability to shift shipments between the U.S. market and other markets in response to price changes.

Asia, Europe, and Latin America[13] are the principal export markets for U.S. producers for components and blends. Canada is also an export market for U.S. producers *** for blends and for *** components.[14] U.S. producers reported that regulation shifts from HCFC R-22 to HFC blends and components has helped to increase demand for HFC blends and components abroad.

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[9] Capacity data was collected on all in-scope and out-of-scope HFC blends and components. Capacity utilization was calculated using the in-scope HFC blends and component production and the total capacity.

[10] In 2015, R-32 made up *** percent of HFC component production; R-125 made up *** percent and R-143a made up *** percent. Out-of-scope component R-134a made up *** percent of HFC component production in 2015.

[11] ***.

[12] In 2015, R-410A made up *** percent of total U.S. blend production; R-404A made up *** percent; R-407A made up *** percent; R-407C made up *** percent; and R-507a made up *** percent.

[13] Firms specifically identified Mexico and South America.

[14] Additionally, U.S. producer *** named Africa as an export destination for blends, U.S. producer *** named the Middle East for components, and U.S producer *** named United Kingdom for components.

Inventory levels

U.S. producers' HFC inventories of components decreased over the period of investigation. U.S. producers' HFC component inventories as a ratio to total shipments decreased from *** percent in 2013 to *** percent in 2015. U.S. producers' HFC inventories of blends increased over the period of investigation. U.S. producers' HFC blend inventories, as ratio to total shipments, increased from *** percent in 2013 to *** percent in 2015. These inventory levels suggest that U.S. producers may have the ability to respond to changes in demand with changes in the quantity shipped from inventories.

Production alternatives

*** U.S. component producers *** indicated that they could not switch production among HFC components or to out-of-scope components. *** indicated that its facilities are set up as ***. It elaborated that it takes *** to switch between components and that nearly *** of production is dedicated to ***.

***[15] of eight responding U.S. producers/reclaimers reported being able to switch production among HFC blends or to out-of-scope blends. *** reported it could produce *** on the same equipment but in separate blend tanks. *** indicated that it could produce *** on the some of the same equipment. *** reported that it could produce out-of-scope refrigerant blends on the same equipment as in-scope HFC blends and that switching production is only limited by the minor constraints of transition losses with the tank heels and purging of transfer lines. Likewise, *** indicated that it could produce out-of-scope refrigerant blends on the same equipment as in-scope HFC blends given time to clear hoses and pumps. *** reported that it uses the same equipment to produce in-scope blends and out-of-scope blends (***) without any significant production restraints.

Supply constraints

All U.S. producers/reclaimers reported no supply constraints since 2013. Two of 19 responding purchasers reported supply constraints for either HFC blends or components.[16] Purchaser *** reported that it has never been offered HFC components consistently at a "fair" price. Purchaser *** reported that U.S. producers Honeywell and Arkema did not respond to requests for quotes nor process orders from *** for HFC components. Purchaser *** indicated that U.S. producers declined to sell HFC blends between January and June 2015 due to low prices.

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[15] U.S. producers *** reported being able to switch production among HFC blends or to out-of-scope blends.

[16] Purchaser *** reported supply constraints, but gave an explanation of "unknown." Purchaser *** reported supply constraints for Chinese producers, not U.S. producers. Their responses were not included in these calculations.

Respondent National indicated that it faced issues in obtaining HFC components from U.S. producers due to the petitioners' reluctance to sell HFC components, that domestic producers restrict the resale of swapped components, unless in a blended product, and that these restrictions do not allow it to buy all three HFC components from a single producer. [17] National testified that it did have business relationships with both Arkema and Honeywell, but it did not have a "written agreement with any domestic component producer" from 2009-2013.[18] National reported that ***.[19] National also indicated that in the past domestically produced HFC components were offered at prices that made it impossible for National to compete in the HFC blend market.[20] Petitioners' indicated that the domestic HFC component producers have supplied independent blenders with HFC components throughout the period of investigation. Petitioners reported that *** has entered into contracts with domestic producers but *** has refused to purchase or cancel future orders because of the presence of lower priced imports from China. U.S. producer *** reported that it had to ***.[21]

Additionally, National testified that since 2013, it could only purchase enough domestically produced component R-125 to satisfy less than one-quarter of its production requirements.[22] National also indicated that domestic producers have the capacity to supply at most *** of National's R-125 needs.[23] National reported that since R-125 is used in all five in-scope HFC blends, the inability to buy R-125 limits National's ability to produce HFC blends or its need for other HFC components.[24] Petitioners testified that there was a global shortage of R-125 in 2011 due to a shortage in the availability of raw material hydrogen fluoride (HF) from China, but that the shortage did not exist between 2013 to 2015.[25] Petitioners also testified that domestic R-125 capacity decreased over the period of investigation due to the petitioners' inability to "make any reasonable profit on our asset base."[26] Petitioners indicated that since 2013, there has been no shortage of supply or domestic capacity to produce R-125. Petitioners reported that since *** can shift production between components, it can produce R-125 on the same machines it now uses to produce ***. Petitioners reported that Chemours *** if market prices increase. [27]

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[17] Conference transcript p 132 (Beatty) and hearing transcript pp. 147-149 (Beatty).
[18] Hearing transcript p. 148 (Beatty).
[19] ***.
[20] National's posthearing brief, pp. A-27-28.
[21] Petitioners' posthearing brief, exh. 1 pp. 48-50, exh. 2, and exh. 3.
[22] Hearing transcript pp. 150 (Beatty).
[23] National's posthearing brief, p. 5.
[24] Hearing transcript pp. 150-151 (Beatty).
[25] Hearing transcript p. 109 (Irani and Sassano) and petitioner's posthearing brief, p. 11.
[26] Hearing transcript, p. 110 (Irani) and petitioner's posthearing brief, p. 11.
[27] Petitioners' posthearing brief, exh. 1, pp. 50-52.

Subject imports from China[28]

Based on available information, HFC producers in China have the ability to respond to changes in demand with moderate-to-large changes in the quantity of shipments to the U.S. market. The main contributing factors to this degree of responsiveness of supply are the *** tempered by an inability to produce alternate products and ***.

Industry capacity

Chinese capacity utilization for HFC components increased from *** percent in 2013 to *** percent in 2015. From 2013 to 2015, Chinese production of HFC components increased by *** percent, and Chinese capacity of HFC components increased by *** percent. This moderately high level of capacity utilization suggests that Chinese producers may have some ability to increase production of HFC components in response to an increase in prices.

Chinese capacity utilization of HFC blends increased from *** percent in 2013 to *** percent in 2015. From 2013 to 2015, Chinese production of HFC blends increased by *** percent, and Chinese capacity of HFC blends increased by *** percent. This relatively low level of capacity utilization suggests that Chinese producers may have a substantial ability to increase production of HFC blends in response to an increase in prices.

Alternative markets

Chinese producers' exports of components, as a percentage of total component shipments, fluctuated from *** percent in 2013 to *** percent in 2014 to *** percent in 2015. Chinese producers' exports of blends, as a percentage of total blend shipments, increased from *** percent in 2013 to *** percent in 2015. In 2015, *** percent of Chinese total component shipments and *** percent of Chinese total blend shipments were to the United States. For components, seven Chinese producers reported that Europe was their principal export market and three indicated that Korea was their principal market. For blends, five Chinese producers reported Europe, three reported Southeast Asia, and two reported Turkey as their principal export markets. Due to the high level of export shipments, Chinese producers may have the ability to shift shipments between the U.S. market and other markets in response to price changes.

Inventory levels

Chinese producers' component inventories as a ratio to total shipments decreased slightly from *** percent in 2013 to *** percent in 2015. Chinese producers' blend inventories as a ratio to total shipments increased slightly from *** percent in 2013 to *** percent in 2015.

[28] For data on the number of responding foreign firms and their share of U.S. imports from China, please refer to Part I, "Summary Data and Data Sources."

These inventory levels suggest that Chinese producers may have a limited ability to respond to changes in demand with changes in the quantity shipped from inventories.

Production alternatives

Twelve of 14 responding Chinese producers stated that they could not switch production among in-scope HFC components or to out-of-scope components. However, *** reported being able to produce *** on the same equipment and *** indicated that it could produce out-of-scope component ***[29]

Most responding Chinese blends producers reported being able to shift production among in-scope HFC blends. Five of 14 responding Chinese blend producers reported that they could switch to out-of-scope blends. However, four Chinese producers reported that they could produce R-406a on the same equipment as in-scope HFC blends but switching is limited by market demand and time to shift production. Other products reported include out-of-scope refrigerant blends (R-401, R-402, R-406a, R-408a, R-413a, and R-415a), R-22, and DYR-5.

Supply constraints

Two of 16 responding importers reported supply constraints with imports of Chinese HFC blends and components. Purchaser *** reported supply constraints due to a Chinese importer shutting down as a byproduct of the "pending tariff."

Nonsubject imports

Nonsubject sources accounted for less than 1 percent of reported HFC blends and components. Nonsubject sources during the period of investigation were *** for components and the *** for blends. For components, *** ***. For blends, ***.

New suppliers

Five of 18 responding purchasers indicated that new suppliers entered the U.S. market since January 1, 2013. Purchasers cited importers BMP, Smart Electric, and LM Supply.

U.S. demand

Based on available information, the overall demand for HFC is likely to experience small changes in response to changes in price. The main contributing factors are the somewhat limited range of substitute products and the small cost share of HFC in most of its end-use products.

[29] Chinese producer *** reported that it could produce more than one in-scope component on the same line but did not specify which components.

End uses

U.S. demand for HFC blends depends on the demand for use in downstream products. Residential air-conditioning is reportedly the largest end use for blends, followed by commercial refrigeration (table II-3). Other end uses include commercial air-conditioning, transport refrigeration, and process refrigeration. In 2015, most shipments of HFC blends R-404A, R-407A, and R-507A were for commercial refrigeration, while HFC blends R-407C and R-410A were sold mostly for residential air-conditioning and heat pumps.

Table II-3
HFC blends: Reported shares of U.S. commercial shipments by end use, 2015

* * * * * * *

Cost share

HFC blends account for a small share of the cost of the end-use products in which they are used. Producers *** and *** reported that HFC blends account for 2 percent or less of the cost in all end uses, and importer *** reported that HFC blends account for 3 percent of the cost of residential air conditioning units and heat pumps and transport refrigeration units. Purchaser *** reported that HFC blends account for less than 5 percent of commercial air conditioning units, residential air conditioning units, and transport refrigeration units.

Business cycles

Most responding U.S. producers, importers, and purchasers reported that HFC blends and components are subject to business cycles (table II-4). Firms indicated that HFC demand is seasonal with most demand occurring directly before the summer months, particularly for the components that go into R-410a. U.S. producers and importers were split on whether or not HFC blends and components were subject to distinct conditions of competition, while most purchasers reported no distinct conditions of competition.

Table II-4

HFC blends and components: Firms' responses regarding business cycles and distinct conditions of competition

Item	U.S. producers		Importers		Purchasers	
	No	Yes	No	Yes	No	Yes
HFC components:						
Subject to business cycles	3	4	4	8	4	6
Subject to distinct conditions of competition	4	3	7	5	7	3
Change to cycles or conditions since 2013	0	5	3	7	4	3
HFC blends:						
Subject to business cycles	2	6	2	14	2	19
Subject to distinct conditions of competition	2	6	3	13	3	18
Change to cycles or conditions since 2013	4	4	8	8	15	6

Source: Compiled from data submitted in response to Commission questionnaires.

Most firms cited EPA regulations as a distinct condition of competition. U.S. producer and importer *** reported that the EPA April 3, 2013 ruling on the allocation of HCFC R-22 greatly decreased the demand for HFC blends and components. [30] It indicated that the EPA ruling increased the supply of R-22 that in turn made R-22 more cost effective than the HFC blend alternatives. Petitioners indicated that while the EPA increased limits on R-22, this increase did not affect the price of HFC blends and components. Petitioners cited the costly modifications needed to allow equipment that use HFC blends to use R-22 and the price of R-22 being five times higher than HFC blends as reasons why R-22 is not competitive with HFC blends.[31]

[30] In 2003, the EPA created a cap-and-trade rule for CFCs and certain HCFCs to comply with the requirements of the 1987 Montreal Protocol (ozone depletion) and 1990 amendments to the Clean Air Act. EPA created a cap-and-trade scheme with company-specific baseline limits on gas-specific production and consumption. The producers could trade percentages inter-company and intra-company of the production/consumption of specific gases as long as the overall thresholds established by the EPA were not exceeded. Once the percentage of a particular baseline was traded (whether inter- or intra-company), it became part of the receiving company's permanent baseline percentage. Using the 2003 regulations, the EPA proposed (in 2010) to calculate the annual baseline reduction based on the company's permanent baseline plus inter-company transfers, but not use intra-company inter-pollutant transfers. When calculating the new baselines in 2010, the EPA retroactively applied the 2010 rule when calculating baselines for companies. This practice was challenged. The Court held that the retroactive effect was impermissible because the statute did not authorize retroactive application and the companies had relied on the earlier rule in making business decisions. EPA simply amended the regulation to make its effect prospective only for those companies adversely affected, thus curing the legal defect. See Arkema Inc. v. Environmental Protection Agency, 618 F.3d 1, 10 (D.C. Cir. 2010) and Protection of Stratospheric Ozone: Adjustments to the Allowance System for Controlling HCFC Production, Import, and Export, 78 Fed. Reg. 20004 (April 3, 2013).

[31] Hearing transcript p. 100 (Sassano) and Petitioners' posthearing brief, p. 2 and exh 1, pp. 11-12.

Most U.S. producers and importers reported that there have been changes to either the business cycles or conditions of competition in the HFC blend and component market. U.S. producers and importers *** cited the increase in availability of Chinese HFC blends as a change in competition. National reported that all five in-scope HFC blends were subject to patents (held by petitioners) that expired between September 2009 and January 2011. National indicated that the expiration of these patents changed conditions of competition for HFC blends because more firms (both domestic and foreign) could produce in-scope blends without being licensed to do so. [32] Purchasers were split on whether or not there had been any changes to the business cycles or conditions of competition in the HFC component market, but a majority reported there had been changes in the HFC blend market. Five purchasers cited the increase in imports from China of HFC blends as a change and three purchasers cited expiration of patents.

Demand trends

Demand for HFC is derived primarily from the demand for new residential air-conditioning and commercial refrigeration equipment and from the servicing of these equipment systems.[33] Petitioners reported using the Air-conditioning, Heating & Refrigeration Institute (AHRI) monthly updates on the number of air-conditioning units and heat pumps shipped to track demand.[34] According to the AHRI, shipments for both air-conditioning units and heat pumps have increased by *** percent from 2012 to mid-year 2015.[35]

Nearly all reporting firms reported that HFC demand within and outside of the United States has increased or fluctuated since January 1, 2013. A majority of U.S. producers and importers and a plurality of purchasers reported that demand for HFC components in the United States increased since 2013 (table II-5). A majority of firms reported that demand for HFC blends has increased.

[32] National's prehearing brief, p. 38 and 45-

[33] Conference transcript, p. 75 (Sassano).

[34] Conference transcript, p. 75-76. (Haun) and Petitioner's postconference brief, exh.1, pp. 5-6.

[35] Petitioners did not update this figure for the final investigation. Petitioner's postconference brief, exh. 6.

Table II-5

HFC blends and components: Firms' responses regarding U.S. demand and demand outside the United States

Item	Number of firms reporting			
	Increase	No change	Decrease	Fluctuate
	HFC components			
Demand inside the United States:				
U.S. producers	3	0	0	2
Importers	6	1	2	2
Purchasers	3	1	1	1
Demand outside the United States:				
U.S. producers	3	0	0	2
Importers	5	1	0	2
Purchasers	2	1	0	0
Item	**Number of firms reporting**			
	Increase	**No change**	**Decrease**	**Fluctuate**
	HFC blends			
Demand inside the United States:				
U.S. producers	5	0	0	2
Importers	11	1	2	1
Purchasers	14	4	0	3
Demand outside the United States:				
U.S. producers	3	0	0	2
Importers	7	1	0	1
Purchasers	5	2	0	0

Source: Compiled from data submitted in response to Commission questionnaires.

U.S. producers and importers ***, importers ***, and purchasers *** reported that changes in regulations regarding CFCs and HCFCs have increased HFC blend and component demand in the United States. *** further explained that the phase out of R-22 led to an increase in demand for R-410A, which increased the demand for its components R-125 and R-32. U.S. producer *** indicated that demand for 404a and 507a has not changed or has decreased, while demand for the other three blends has increased. Producer and importer *** indicated that demand for HFC components is based on the demand for blends.

Substitute products

All responding firms reported that no substitutes exist for HFC components. Firms did indicate that there were some substitutes for HFC blends, but that substitutability was limited (table II-6).

Table II-6

HFC blends: Firms' responses regarding out-of-scope HFC blend substitutes for HFC blends[1]

In-scope HFC blend	Out-of-scope HFC substitute	Modifications needed	Price effect
R-404a	R-407b, R-407f,[2] R-408a, R-421b, R-422a, R-428a, R-442a, R-448a, R-449a, R-449b, and R-452a	No changes with tube evacuation or equipment retrofitting.	Firms reported that R404a is less expensive than most substitutes.
R-407a	R-407f, [2] R-408a, R-421a, R-421b, R-422b, R-422d, R-422e, and R-434a	Minor changes to equipment.	Firms reported that R407f is more expensive and has a more limited distribution due to being patented.
R-407c	R-407f, [2] R-417a, R-417b, R-419a, R-419b, R-421a, R-421b, R-422b, R-422d, R-424a, and R-22	No changes or minor changes to equipment.	Firms reported that R407c is less expensive than R-424a and R-407f.
R-507a	R-448a and R-449a	Most systems will need to undergo retrofit of existing equipment to accept this replacement.	Firms reported that these replacements are based on regulation, not price.

[1] No firm reported out-of-scope substitutes for R-410a blend.
[2] R-407f was the most reported out-of-scope substitute.

Source: Compiled from data submitted in response to Commission questionnaires.

For commercial refrigeration, U.S. producer *** reported that carbon dioxide can be substituted for HFC blends and components, but is not widely used. Additionally, *** reported that HCFCs, particularly R-22, can be substituted for R-407c blend; however, their use is highly regulated by the government. For commercial and transportation refrigeration, *** reported that hydrofluoroolefins (HFOs) are potential substitutes but that HFOs are an emerging technology and have only recently become commercially available per EPA SNAP approval. Both firms indicated that current equipment would need to be modified to use HFOs.

SUBSTITUTABILITY ISSUES

The degree of substitution between domestic and imported HFC depends upon such factors as relative prices, quality (e.g, reliability of supply, etc.), and conditions of sale (e.g., price discounts/rebates, lead times between order and delivery dates, payment terms, product services, etc.). Based on available data, staff believes that there is a high degree of substitutability between domestically produced HFC blends and components and product imported from China.

Lead times

U.S. producers *** sold HFC blends and components from U.S. inventories (table II-7). The vast majority of importers' U.S. commercial shipments of HFC components were produced to order. Two (***) reported selling HFC components exclusively produced-to-order, and the

other two firms (***) exclusively sold from inventories.[36] Ten of 11 responding importers reported selling HFC blends exclusively from U.S. inventories.[37] U.S. producers reported an average of 5 days of lead time for both HFC blends and components. U.S. importers reported an average of 57 days[38] of lead times for produced-to-order HFC components and 3 days from inventories. U.S. importers reported an average of 7 days of lead times for produced-to-order HFC components and 4 days from inventories.

Table II-7
HFC blends and components: U.S. producers' and U.S. importers' lead times, 2015

* * * * * * *

Knowledge of country sources

Eighteen purchasers indicated that they had marketing/pricing knowledge of domestic product, 12 of Chinese product, and two of product from nonsubject countries. As shown in table II-8, most purchasers reported that their firms and their customers "sometimes" or "never" make purchasing decisions based on the producer or country of origin. The five purchasers that reported that they always make decisions based on the manufacturer cited better service, price, and long-term business relationships.

Table II-8
HFC blends and components: Purchasing decisions based on producer and country of origin

Decision	Always	Usually	Sometimes	Never
Purchases based on producer: Purchaser's decision	5	4	8	4
Purchaser's customer's decision	0	1	9	6
Purchases based on country of origin: Purchaser's decision	1	3	8	8
Purchaser's customer's decision	0	1	7	7

Source: Compiled from data submitted in response to Commission questionnaires.

Factors affecting purchasing decisions

For HFC components, the four responding purchasers' most often cited top three factors in their purchasing decisions were price and quality (three firms each) as shown in table II-9a. Quality was the most frequently cited first-most important factor (cited by two firms).

[36] *** reported lead times of 60 days, whereas the other three responding firm's lead times ranged 2 to 4 days.

[37] *** reported selling 35 percent of its U.S. commercial shipments produced to order.

[38] *** reported lead times of 60 days, and *** reported 4 days.

Table II-9a
HFC components: Ranking of factors used in purchasing decisions as reported by U.S. purchasers, by factor

Item	First	Second	Third	Total
	Number of firms			
Price / Cost	1	2	0	3
Quality	2	0	1	3
Availability / Supply	1	1	0	2
All others[1]	0	1	2	3

[1] Other factors include delivery schedule, lead time, and volume.

Source: Compiled from data submitted in response to Commission questionnaires.

For HFC blends, the 18 responding purchasers' most often cited top three factors in their purchasing decisions were price/cost (19 firms) and quality and availability/supply (11 firms each) as shown in table II-9b. Price/cost was the most frequently cited first- and second-most important factor cited by nine firms and seven firms, respectively.

Table II-9b
HFC blends: Ranking of factors used in purchasing decisions as reported by U.S. purchasers, by factor

Item	First	Second	Third	Total
	Number of firms			
Price / Cost	9	7	3	19
Quality	6	3	2	11
Availability / Supply	2	7	2	11
Lead time/delivery	0	3	2	5
Supplier relationship	2	0	3	5
All others[1]	1	1	8	10

[1] Other factors include ability to buy components in addition to blends (***), technical support, credit terms, packaging, payment discounts, and location.

Source: Compiled from data submitted in response to Commission questionnaires.

The majority of purchasers (18 of 20) reported that they usually or sometimes purchase the lowest-priced product. When asked if they purchased HFC blends and components from one source although a comparable product was available at a lower price from another source, two purchasers reported reasons including wanting to support domestic sources of supply. Other firms cited quality, reliability of supply, contract requirements, product bundling, and tax and logistical concerns. Two of six HFC component purchasers and two of 17 blend purchasers reported that certain types of product were only available from a single source. Purchasers *** reported that U.S. producers have limited or inconsistent supply and that they have to buy HFC components from China. Purchasers *** reported that cylinders larger than 100 pounds are generally only sourced domestically.

Importance of specified purchase factors

Purchasers were asked to rate the importance of 15 factors in their purchasing decisions (table II-10). The factors rated as "very important" by more than half of responding purchasers were availability (21 each), quality meets industry standards (20 each), product consistency and reliability of supply (19 each), and price (15 each). Fifteen purchasers reported that minimum quantity requirements were "not important."

Table II-10
HFC blends and components: Importance of purchase factors, as reported by U.S. purchasers, by factor

Factor	Number of firms reporting		
	Very important	Somewhat important	Not important
Availability	21	0	0
Delivery terms	11	10	0
Delivery time	12	9	0
Discounts offered	11	9	1
Extension of credit	6	8	8
Minimum quantity requirements	3	3	15
Packaging	8	10	3
Price	15	6	0
Product consistency	19	2	0
Product range	5	12	4
Quality exceeds industry standards	4	10	8
Quality meets industry standards	20	1	0
Reliability of supply	19	2	0
Technical support/service	5	11	5
U.S. transportation costs	5	10	6

Source: Compiled from data submitted in response to Commission questionnaires.

Supplier certification

Eight of 21 responding purchasers require their suppliers to become certified or qualified to sell HFC blends and components to their firm. Two purchasers (***) reported that the time to qualify a new supplier ranged from 1 to 5 days; and four purchasers (***) reported 30 to 90 days. Most suppliers reported testing samples from producers and the ability to pass AHRI specifications as being a part of the certification process. Only purchaser *** reported that a supplier had failed in its attempt to qualify product, or had lost its approved status since 2013; it did not specify a producer or country of origin.

Changes in purchasing patterns

Purchasers were asked about changes in their purchasing patterns from different sources since 2013 (table II-11); reasons reported for changes in sourcing included price, allocation of R-22 by the EPA, the antidumping investigation, and market conditions. Eleven of

21 responding purchasers reported that they had changed suppliers since January 1, 2013. Specifically, firms added or increased purchases from BMP, Dynatemp, Hudson, Nortek, and United Refrigeration because of price. Purchaser *** reported adding U.S. producers due to the antidumping investigation, and purchaser *** reported dropping Honeywell because it no longer supplies product but did not elaborate further. Four of 21 responding purchasers reported adding importer BMP as a supplier.

Table II-11
HFC blends and components: Changes in purchase patterns from U.S., subject, and nonsubject countries

Source of purchases	Did not purchase	Decreased	Increased	Constant	Fluctuated
	HFC components				
United States	11	2	2	1	1
China	13	1	0	0	2
All other sources	14	0	1	0	1
Sources unknown	16	0	1	0	0
	HFC blends				
United States	2	3	6	6	4
China	9	1	9	1	0
All other sources	17	0	0	0	1
Sources unknown	14	1	1	1	1

Source: Compiled from data submitted in response to Commission questionnaires.

Importance of purchasing domestic product

Twenty responding purchasers reported that purchasing U.S.-produced product was not an important factor in their purchasing decisions. Seven reported that U.S.-produced product was required by their customers (for 7.4 percent of their purchases), and three reported other preferences for domestic product or that domestic product was required by law (for a combined less than 1 percent of their purchases).

Comparisons of domestic products, subject imports, and nonsubject imports

Purchasers were asked a number of questions comparing HFC blends and components produced in the United States, China, and nonsubject countries. First, purchasers were asked for a country-by-country comparison on the same 15 factors (table II-12) for which they were asked to rate the importance. Most purchasers reported that U.S. and Chinese product were comparable on packaging, product consistency, quality meets industry standards, extension of credit, and quality exceeds industry standards. For the four factors cited most often as “very important” (availability, quality meets industry standards, price, and reliability of supply, see table II-10), U.S. and Chinese product were identified as comparable by most purchasers.

Table II-12

HFC blends and components: Purchasers' comparisons between U.S.-produced and imported product

Factor	Number of firms reporting								
	United States vs. China			United States vs. Nonsubject			China vs Nonsubject		
	S	C	I	S	C	I	S	C	I
Availability	3	8	4	2	2	1	0	2	0
Delivery terms	3	8	4	0	3	2	0	1	0
Delivery time	8	6	1	1	3	1	0	1	0
Discounts offered	6	5	4	2	2	1	0	1	0
Extension of credit	2	12	1	1	3	1	0	1	0
Minimum quantity requirements	4	8	3	0	2	3	0	1	0
Packaging	2	12	1	0	4	1	0	2	0
Price[1]	1	0	14	1	2	2	2	0	0
Product consistency	2	13	0	1	4	0	1	1	0
Product range	7	6	2	1	3	1	1	0	1
Quality exceeds industry standards	3	12	0	2	3	1	0	2	0
Quality meets industry standards	2	13	0	2	3	1	0	2	0
Reliability of supply	5	8	2	2	3	0	0	2	0
Technical support/service	8	7	0	1	4	0	0	1	1
U.S. transportation costs[1]	6	8	1	2	2	1	0	2	0

[1] A rating of superior means that price/U.S. transportation costs is generally lower. For example, if a firm reported "U.S. superior," it meant that the U.S. product was generally priced lower than the imported product.

Note.--S=first listed country's product is superior; C=both countries' products are comparable; I=first list country's product is inferior.

Source: Compiled from data submitted in response to Commission questionnaires.

Comparison of U.S.-produced and imported HFC blends and components

In order to determine whether U.S.-produced HFC blends and components can generally be used in the same applications as imports from China and nonsubject countries, U.S. producers and importers were asked whether the products can "always," "frequently," "sometimes," or "never" be used interchangeably. As shown in table II-13, most U.S. producers, importers, and purchasers reported that HFC blends and components produced in the United States, China, and nonsubject countries are "always" interchangeable.

Table II-13

HFC blends and components Interchangeability between HFC blends and components produced in the United States and in other countries, by country pairs

Country pair	U.S. Producers				U.S. importers				U.S. purchasers			
	A	F	S	N	A	F	S	N	A	F	S	N
	HFC components											
United States vs. China	6	0	0	0	10	1	0	0	4	0	0	0
United States vs. Other	4	0	0	0	8	0	1	0	2	1	0	0
China vs. Other	4	0	0	0	8	0	0	0	2	1	0	0
	HFC blends											
United States vs. China	6	0	0	0	11	1	1	0	8	3	1	0
United States vs. Other	4	0	0	0	8	0	0	0	5	2	0	0
China vs. Other	4	0	0	0	8	0	0	0	4	2	0	0

Note.—A=Always, F=Frequently, S=Sometimes, N=Never.

Source: Compiled from data submitted in response to Commission questionnaires.

As can be seen from table II-14, 14 of 19 responding purchasers reported that domestically produced product "always" met minimum quality specifications. Six of 12 responding purchasers reported that the Chinese product "always" met minimum quality specifications.

Table II-14

HFC blends and components: Ability to meet minimum quality specifications, by source[1]

Source	Always	Usually	Sometimes	Rarely or never
United States	14	5	0	0
China	6	6	0	0
Other	1	3	0	0

[1] Purchasers were asked how often domestically produced or imported HFC blends and components meet minimum quality specifications for their own or their customers' uses.

Source: Compiled from data submitted in response to Commission questionnaires.

In addition, producers, importers, and purchasers were asked to assess how often differences other than price were significant in sales of HFC blends and components from the United States, China, or nonsubject countries. As seen in table II-15, most reporting U.S. producers and importers indicated that differences other than price between all country pairs were "sometimes" or "never" significant. U.S. producers, importers, and purchasers *** and *** indicated that there were "always" or "frequently" (respectively) differences other than price and cited availability of U.S. supply and product range. National reported that the ability to meet industry specifications (specifically AHRI 700 specifications) and the ability to purchase multiple components from one source are factors affecting purchasers' decisions.[39] Importer *** indicated that purchaser preferences for domestic product differentiated U.S. and Chinese

[39] Conference transcript, pp. 170-1 (Beatty and Freed).

products. *** reported that besides price, lead time was a primary factor in purchasing decisions.[40]

Table II-15

HFC blends and components: Significance of differences other than price between HFC blends and components produced in the United States and in other countries, by country pairs

Country pair	U.S. producers				U.S. importers				U.S. purchasers			
	A	F	S	N	A	F	S	N	A	F	S	N
	HFC components											
United States vs. China	1	1	2	2	2	1	2	6	2	1	1	0
United States vs. Other	0	0	2	2	1	0	2	5	1	0	1	1
China vs. Other	0	0	2	2	1	0	2	5	0	1	1	1
	HFC blends											
United States vs. China	1	0	2	3	2	0	4	7	3	0	8	2
United States vs. Other	0	0	2	2	1	0	3	4	2	0	3	2
China vs. Other	0	0	2	2	1	0	3	4	0	1	2	2

Note.--A = Always, F = Frequently, S = Sometimes, N = Never.

Source: Compiled from data submitted in response to Commission questionnaires.

ELASTICITY ESTIMATES

U.S. supply elasticity

The domestic supply elasticity[41] for HFC blends and components measures the sensitivity of the quantity supplied by U.S. producers to changes in the U.S. market price of HFC blends and components The elasticity of domestic supply depends on several factors including the level of excess capacity, the ease with which producers can alter capacity, producers' ability to shift to production of other products, the existence of inventories, and the availability of alternate markets for U.S.-produced HFC blends and components. Analysis of these factors earlier indicates that the U.S. industry has the ability to moderately increase or decrease shipments to the U.S. market; an estimate in the range of 3 to 5 is suggested, with HFC components on the lower end of that range.

U.S. demand elasticity

The U.S. demand elasticity for HFC blends and components measures the sensitivity of the overall quantity demanded to a change in the U.S. market price of HFC blends and components. This estimate depends on factors discussed earlier such as the existence, availability, and commercial viability of substitute products, as well as the component share of the HFC blends and components in the production of any downstream products. Based on the

[40] Conference transcript, pp. 77-8 (Clark and Haun).

[41] A supply function is not defined in the case of a non-competitive market.

available information, the aggregate demand for HFC blends and components is likely to be inelastic; a range of -0.5 to -0.75 is suggested.[42]

Substitution elasticity

The elasticity of substitution depends upon the extent of product differentiation between the domestic and imported products.[43] Product differentiation, in turn, depends upon such factors as quality (e.g., chemistry, etc.) and conditions of sale (e.g., availability, sales terms, discounts, etc.). Based on available information, the elasticity of substitution between U.S.-produced HFC blends and components and imported HFC blends and components is likely to be in the range of 3 to 5.

[42] Both petitioners and respondents agreed that demand is inelastic and that demand for HFC blends is driven by the retrofitting of equipment/installation of new base equipment. Respondents also indicated that demand is notably affected by the R-22 phase-out. Neither suggested a change in the demand elasticity range. Petitioners' prehearing brief, pp. 2-3, and National's posthearing brief p. A-18.

[43] The substitution elasticity measures the responsiveness of the relative U.S. consumption levels of the subject imports and the domestic like products to changes in their relative prices. This reflects how easily purchasers switch from the U.S. product to the subject products (or vice versa) when prices change.

PART III: U.S. PRODUCERS' PRODUCTION, SHIPMENTS, AND EMPLOYMENT

The Commission analyzes a number of factors in making injury determinations (see 19 U.S.C. §§ 1677(7)(B) and 1677(7)(C)). Information on the dumping margins was presented in *Part I* of this report and information on the volume and pricing of imports of the in-scope merchandise is presented in *Part IV* and *Part V*. Information on the other factors specified is presented in this section and/or *Part VI* and (except as noted) is based primarily on the questionnaire responses of three firms (Arkema, Chemours, Honeywell)[1] that accounted for all the in-scope component production and six firms (***) that accounted for the vast majority of in-scope blend production in 2015.[2]

U.S. PRODUCERS, BLENDERS, AND RECLAIMERS

The Commission issued U.S. producer/blender/reclaimer questionnaires to 65 firms based on information contained in the petition, the record in the preliminary phase, and publically available data on reclaimers of refrigerants. Six firms (***) provided useable data on their operations of in-scope component and blends production.[3] These responses represent all

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[1] Discussions on out-of-scope R-134a include the questionnaire response of two in-scope producers, ***, and the response of one additional out-of-scope R-134a producer, ***. Mexichem only produces R-134a, a semifinished component used in the downstream production of in-scope blends. Mexichem ***.

[2] Additional responses were received by U.S. blenders and reclaimers of refrigerants who provided partial data and accounted for less than *** percent of in-scope production. Their responses, where appropriate, have been included in the data for this section. The 61 EPA-certified refrigerant reclaimers (also known as recyclers) operating in March 2016 were emailed U.S. producer questionnaires. This list is found at https://www.epa.gov/section608/epa-certified-refrigerant-reclaimers. These reclaimers are certified to reclaim out-of-scope ozone-depleting substances, such as CFC (R-12) and HCFCs (R-22). The EPA has not imposed mandatory requirement to reclaim HFCs, which are global warming potential substances and not ozone-depleting substances. No company is certified to reclaim the in-scope HFC products. A witness at the hearing stated that the volumes of recycled in-scope HFC blends are "very insignificant relative to the amount of R-22 that gets reclaimed and recycled," mostly due to the fact that R-22 has a much higher market price (around $300 a cylinder) than the in-scope blends. National's posthearing brief, p. A-74 and hearing transcript, p. 115-116 (Bachman) and p. 195 (Beatty).

[3] Unless otherwise specified, "in-scope components" refer to R-32, R-125, and R-143a; "in-scope blends" refer to R-404A, R-407A, R-407C, R-410A, and R-507A; and "in-scope products" refer to the three in-scope components and the five in-scope blends. "Out-of-scope component" and "R-134a" refer to the production of R-134a by Arkema, Chemours, and Mexichem (with less than 0.5 percent of reclaimed R-134a reported by ***. "HFC components" refer to R-32, R-125, R-143a, and out-of-scope R-134a. "Out-of-scope blends" or "refrigerant blends" refer to any refrigerant blend that is not one of the five in-scope blends listed above. "U.S. producers" refer to producers of the in-scope components, blenders of in-scope blends, and reclaimers of in-scope blends and components. "Integrated producers" refer to the three U.S. producers (Arkema, Chemours, and Honeywell) of both in-scope components and

(*continued*...)

U.S. in-scope component production, all out-of-scope R-134a production,[4] and virtually all U.S. production of in-scope blends.[5]

As noted in *Part I* of this report, each HFC component require a separate manufacturing facility. At least two HFC components are needed to make an in-scope blend. No HFC component producer in the United States manufactures all four of the HFC components necessary to produce all five in-scope blends. To obtain all the HFC components necessary for in-scope blend production, the three in-scope component producers[6] in the United States engage in swapping arrangements with one another. In addition, all three in-scope component producers and the largest in-scope blender *** imported and/or purchased the HFC components necessary to make in-scope blends.

Tables III-1 and III-2 list U.S. component producers and blenders/reclaimers of HFC, their production locations, positions on the petition, and shares of total production in 2015. Arkema, ***. Chemours ***.[7] Honeywell ***.

(…*continued*)
blends while "stand-alone blenders/reclaimers" refer to firms reporting blending and/or reclaiming in-scope products but did not have HFC component production. The in-scope U.S. producers providing trade data are: ***. Four additional U.S. producers (***), provided partial responses (***). The partial responses of these four U.S. producers (***) are included in the narratives of this report, when appropriate.

[4] Mexichem's operations on out-of-scope R-134a are included in data tables and discussion on R-134a.

[5] As noted in *Part I*, there is another group of HFC blenders known as "reclaimers" that primarily reclaim R-22. The Clean Air Act, section 608, prohibits the venting of ozone-depleting substances such as CFCs and HCFCs. Although HFCs are ozone-friendly substitutes, they do contribute to global warming. According to the EPA, used HFCs should not be vented into the atmosphere and should be sent to a destruction or reclamation facility, but there is no current requirement for the reclamation of HFCs. Retrieved from https://www.epa.gov/sites/production/files/documents/ConstrAndDemo_EquipDisposal.pdf, May 31, 2016. Some of these R-22 reclaimers can also mix the in-scope blends in their facilities. Counsel for National argued that "reclaiming and blending are not the same, either in terms of scale or the nature of the operations, and the financial, technical, and regulatory barriers to enter the blending industry are high." Hearing transcript, p. 180 (Goldfeder).

[6] Chemours closed its R-125 production facility ***. For the purposes of this investigation, Chemours is included in the in-scope component producer group since it did produce in-scope component R-125 during the period of investigation.

[7] Chemours reported that ***. *Hydrofluorocarbon Blends and Components from China: Investigation No. 731-TA-1279 (Preliminary)*, USITC Publication 4558, August 2015, p. III-2, fn. 4 and Petitioners' posthearing brief, exh. 1-31. Chemours testified that its R-125 plant has "all the equipment sitting there" so it could "re-evaluate" restarting this plant. Hearing transcript, p. 72 (Sassano).

Table III-1

HFC components: U.S. producers, their position on the petition, location of production, and share of reported component production, 2015

Firm	Position on petition	Production location(s)	Share of component production (percent)					
			R-32	R-125	R-143a	In-scope components	R-134a	All components
Arkema	Support	Calvert City, KY	***	***	***	***	***	***
Chemours	Support	Louisville, KY Ingleside, TX Deepwater, NJ	***	***	***	***	***	***
Honeywell	Support	Baton Rouge, LA Geismar, LA	***	***	***	***	***	***
ICOR	***	Indianapolis, IN	***	***	***	***	***	***
Mexichem	***	St. Gabriel, LA	***	***	***	***	***	***
Total			***	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Table III-2

HFC blends: U.S. producers, their position on the petition, location of production, and share of reported in-scope blend production, 2015

Firm	Position on petition	Production location(s)	Share of in-scope blend production (percent)					
			R-404A	R-407A	R-407C	R-410A	R-507A	In-scope blends
Arkema	Support	Calvert City, KY	***	***	***	***	***	***
Chemours	Support	Louisville, KY Ingleside, TX Deepwater, NJ	***	***	***	***	***	***
Golden	Support	Livonia, Michigan	***	***	***	***	***	***
Honeywell	Support	Baton Rouge, LA Geismar, LA	***	***	***	***	***	***
ICOR	***	Indianapolis, IN	***	***	***	***	***	***
National	***	Rosenhayn, NJ	***	***	***	***	***	***
Total			***	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Table III-3 lists the out-of-scope U.S. producers and blenders/reclaimers of refrigerants, their production locations, positions on the petition and shares of total production in 2015. *** are the largest blenders of out-of-scope refrigerant blends in 2015.

Table III-3

Refrigerant blends: U.S. producers, their position on the petition, location of production, and share of reported out-of-scope blend production, 2015

Firm	Position on petition	Production location(s)	Share of out-of-scope blend production (percent)
Arkema	Support	Calvert City, KY	***
Chemours	Support	Louisville, KY Ingleside, TX Deepwater, NJ	***
Honeywell	Support	Baton Rouge, LA Geismar, LA	***
ICOR	***	Indianapolis, IN	***
National	***	Rosenhayn, NJ	***
RMS	***	Alpharetta, GA	***
Total			***

Source: Compiled from data submitted in response to Commission questionnaires.

Table III-4 presents information on U.S. producers' ownership, related and/or affiliated firms, and the extent of affiliation or ownership.

Table III-4

HFC: U.S. producers' ownership, related and/or affiliated firms, since January 2013

* * * * * * *

Table III-5 presents information on in-scope and out-of-scope U.S. producers' reported changes in operations from 2013 to 2015.

Table III-5

HFC: U.S. producers' reported changes in operations from January 1, 2013 to December 31, 2015

* * * * * * *

U.S. PRODUCTION, CAPACITY, AND CAPACITY UTILIZATION

U.S. Component Producers

Table III-6 and figure III-1 present data on U.S. producers' production of HFC components. The capacity for two in-scope components, R-32 and R-143a, stayed the same from 2013 to 2014 while the capacity for in-scope component R-125 and out-of-scope component R-134a declined from 2013 to 2015. Production for R-32 increased each year from 2013 to 2015 while production for R-143a fluctuated slightly in the same period. As shown previously in table III-5, two in-scope component producers, ***, closed R-125 plants during the period of investigation, accounting for the decline in both capacity and production of R-125

from 2013 to 2015. R-125 is the only in-scope component used in all five in-scope blends and currently produced by one U.S. producer, Honeywell.

Table III-6
HFC components: U.S. producers' capacity, production, and capacity utilization of HFC components, 2013-15

* * * * * * *

Figure III-1
HFC components: U.S. producers' capacity, production, and capacity utilization for in-scope components, 2013-15

* * * * * * *

Table III-7 presents responses by U.S. producers' and out-of-scope U.S. producer Mexichem's ability to shift production from HFC components to other products. No U.S. producer/reclaimer of in-scope or out-of-scope products *** reported the ability to switch production from HFC components to HFC blends. However, one in-scope component producer, ***.

Table III-7
HFC: U.S. producers' ability to shift HFC component production

Item	Number of firms indicating NO (count)	Number of firms indicating YES (count)
U.S. producers.--		
Able to switch between components	7	0
Able to switch from components to other products[1]	6	1

[1] U.S. producer *** indicates it can produce *** on one of its *** lines with an approximate one month recalibration period to switch production.

Source: Compiled from data submitted in response to Commission questionnaires.

Table III-8 presents data on ***'s production of out-of-scope component R-113 using the same equipment as in-scope components. From 2013 to 2015, ***'s production of in-scope components ranged from *** percent in 2013 to *** percent in 2015 of its overall production.

Table III-8
HFC: * and overall U.S. producers' production of other products using in-scope component machinery and equipment, 2013-15**

* * * * * * *

As discussed later in table III-20 and appendix D, all three integrated U.S. producers of in-scope components *** from 2013 to 2015. In addition to their own production ***, integrated producers (Arkema, Chemours,[8] and Honeywell) engage in swapping agreements to procure the additional HFC components they need to make in-scope blends.[9] When the swap agreements were created, each company had already invested and producing their respective HFC components.[10] These swapping agreements ***. Stand-alone blenders or reclaimers are not part of swap agreements for HFC components since they do not produce any HFC components. ***.[11] Table III-9 and figure III-2 present details on these swap agreements for ***. All three integrated producers also sell or purchase HFC components outside of swap arrangements to one another because swap agreements ***.[12]

Table III-9
HFC components: U.S. producers' reported swap agreements from 2013-15

* * * * * * *

Figure III-2
HFC components: U.S. producers' reported swap agreements from 2013-15

* * * * * * *

The swap agreement between *** and *** is a barter agreement ***. ***.[13] ***.[14] [15]

The swap agreement between *** and *** is a cross-supply agreement ***.[16]

From 2013 to 2015, Mexichem, an out-of-scope R-134a producer, ***. ***. Mexichem also ***.

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[8] As of July 2014, Chemours produces only the out-of-scope component, R-134a, in addition to producing in-scope HFC blends.

[9] Petitioners contend that swapping contracts ***. A witness from Arkema testified that swaps are not uncommon in the commodity chemicals industry and maximizes economies of scale meant to create efficiencies and improve costs. *Hydrofluorocarbon Blends and Components from China: Investigation No. 731-TA-1279 (Preliminary)*, USITC Publication 4558, August 2015, p. III-4, fn. 5 and hearing transcript, p. 83-84 (Rowe).

[10] Petitioners noted that integrated producers did not decide together which producer would produce which component. Petitioners' posthearing brief, exh. 1-45.

[11] ***. Petitioners' posthearing brief, exh. 1-46 and 1-47.

[12] Petitioners' posthearing brief, exh. 1-47.

[13] Petitioners' postconference brief, exh. 5.

[14] Petitioners' posthearing brief, exh. 15.

[15] ***. Petitioners' postconference brief, exh. 5 and Petitioners' posthearing brief, exh. 15.

[16] ***. Petitioners' posthearing brief, exh. 15.

U.S. Blenders and Reclaimers

Table III-10 presents data on U.S. producers' capacity, production, and capacity utilization of in-scope blends from 2013 to 2015. The in-scope blends make up the vast majority of all HFC blends in the U.S. market. Based on responses from U.S. producers, virtually all in-scope blends are made with virgin components, with *** percent made with reclaimed components.[17] Table III-11 presents information on reclaiming operations. Seven responding U.S. producers, ***, reported operations as a reclaimer of in-scope HFC.[18] All of these reclaimers of the in-scope product also reported reclaiming out-of-scope refrigerants, primarily R-22.[19] Reclaimers collect used blends, clean them according to AHRI 700 standard, and re-introduce the cleaned HFC blends into the market.[20]

Table III-10
HFC blends: U.S. producers' capacity, production, and capacity utilization of in-scope blends, 2013-15

* * * * * * *

Figure III-3
HFC: U.S. producers' capacity, production, and capacity utilization for in-scope blends, 2013-15

* * * * * * *

[17] Petitioners testified that out-of-scope blends account for three percent of the HFC market in the United States and that fire suppression merchant market for R-125 accounts for one percent. The five in-scope blends account for "96 percent" of the HFC market in the United States. Hearing transcript, p. 54-56 (Sassano) and p. 106 (Clark).

[18] ***.

[19] U.S. reclaimers mostly reclaim/recover R-22 and R-12 (both of these have been phased out since the 1990s but are still used in the replacement market today), along with some reclamation of out-of-scope component R-134a. Both R-12 and R-22 are ozone depleting and global warming contributing chemicals. R-12 is a CFC and used primary in cooling systems in cars and replaced by R-134a. R-22 is an HCFC refrigerant and used for residential and commercial air conditioning and commercial refrigeration applications, with in-scope blends as replacements. R-22 production in the United States was banned in 2010, but imports of R-22 as refrigerants will not be banned until 2020. Retrieved from https://www.epa.gov/ods-phaseout/phaseout-class-ii-ozone-depleting-substances and https://www.chemours.com/Refrigerants/en_US/products/Freon/Freon22.html, June 3, 3016.

[20] *Hydrofluorocarbon Blends and Components from China: Investigation No. 731-TA-1279 (Preliminary)*, USITC Publication 4558, August 2015, p. III-5, fn. 9.

Table III-11

HFC: Information on U.S. producers' reclamation activities for in-scope blends, 2013-15

Blend	Number of firms	List of firms
R-404A	6	***
R-407A	4	***
R-407C	4	***
R-410A	6	***
R-507A	5	***
Out-of-scope blends	4	***

Source: Compiled from data submitted in response to Commission questionnaires.

All three in-scope component producers also produce in-scope blends and out-of-scope refrigerant blends.[21] In addition to the three integrated in-scope producers, National is the largest stand-alone blender of HFCs in the United States and also is a large reclaimer of refrigerants.[22] National reported importing in-scope components exclusively for use in its blending operations and did not import any in-scope blends. National also purchased HFC components from domestic producers throughout 2013 to 2015.

Another stand-alone HFC blender and importer, ICOR explained that ***.[23] ***. ICOR reported that ***. ICOR reported that it ***.[24]

A third responding stand-alone in-scope blender and reclaimer, Golden reported ***.

The remaining responding U.S. blenders/reclaimers are: ***,[25] ***,[26] [27] ***,[28] and ***.[29] These U.S. blenders/reclaimers did not provide data on their in-scope blending operations.[30]

Most of the responding U.S. producers also produce out-of-scope blends under current patent protection. All five in-scope blends were also under previous patent protection, which expired between 2009 and 2011. Table III-12 presents information on the previous patent protection on in-scope blends.

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[21] None of the three integrated producer reported reclaiming operations for in-scope HFC; however, *** reported ***.

[22] ***.

[23] Hot Shot®, or R-414B, is a class 2 ozone depleting substance and subject to phase out. It is used in autos, aircrafts, and boats (or in any system where R-12 was used) without needing any system modifications. Retrieved from http://www.icorinternational.com/hotshot.html, June 3, 3016.

[24] ***.

[25] ***.

[26] ***. In November 2015, it acquired three reclamation facilities from Polar Technologies, making Hudson the largest refrigerant reclaimer in the United States, with over 25 percent of market share. Hudson's U.S. producer questionnaire response and http://www.hudsontech.com/wp-content/uploads/2015/11/Hudson-Presentation-November2015.pdf, retrieved May 31, 2016.

[27] ***.

[28] ***.

[29] ***.

[30] ***.

Table III-12
HFC: Information on U.S. producers' patents for in-scope blends

* * * * * * *

Table III-13 presents data on U.S. producers' overall capacity and production of out-of-scope blends using the same equipment as in-scope blending operations.

Table III-13
HFC blends: Overall U.S. producers' production of out-of-scope blends using in-scope blending machinery and equipment, 2013-15

* * * * * * *

U.S. PRODUCERS' U.S. SHIPMENTS AND EXPORTS

Table III-14 presents U.S. producers' U.S. shipments, export shipments, and total shipments (excluding swaps) of in-scope components. Excluding swaps, internal consumption accounted for between *** percent to *** percent of U.S. producers' total shipments of in-scope components from 2013 to 2015. No transfers to related firms for in-scope components were reported from 2013 to 2015.[31] The number of U.S. producers' total shipments declined from 2013 to 2015, in both quantity and value. U.S. producers reported exporting in-scope components to ***.

Table III-15 presents U.S. producers' U.S. shipments, export shipments, and total shipments (excluding swaps) of out-of-scope component R-134a. Excluding swaps, internal consumption was a very small part of U.S. producers' total shipments of R-134a, declining steadily from *** percent in 2013 to *** percent in 2015. No transfers to related firms for R-134a were reported from 2013 to 2015. The quantity of U.S. producers' total shipments of R-134a increased from 2013 to 2014 but declined to lowest level in 2015 for this period, while the value decreased each year from 2013 to 2015. U.S. producers reported exporting R-134a to ***.

[31] Swap arrangements are not reported as transfers to related firms.

Table III-14
HFC components: U.S. producers' U.S. shipments, export shipments, and total shipments (excluding swaps) of virgin in-scope components, 2013-15

* * * * * * *

Table III-15
R-134a: U.S. producers' U.S. shipments, export shipments, and total shipments (excluding swaps) of out-of-scope component R-134a, 2013-15

* * * * * * *

Table III-16 presents data on U.S. producers' U.S. shipments, export shipments, and total shipments of in-scope blends. No U.S. producer reported transfers to related firms for in-scope blends and very small amounts of internal consumption from 2013 to 2015. U.S. producers' total shipments of in-scope blends, in terms of quantity and unit value fluctuated from 2013 to 2015. In terms of value, U.S. producers' total shipments of in-scope blends declined from 2013 to 2015. U.S. producers reported exporting in-scope blends to ***.

Table III-16
HFC blends: U.S. producers' U.S. shipments, export shipments, and total shipments of in-scope blends, 2013-15

* * * * * * *

Table III-17 presents data on U.S. producers' U.S. shipments of in-scope products (both components and blends) by source of inputs from 2013 to 2015. The majority of U.S. producers' U.S. shipments of in-scope products were blends made with domestically-produced in-scope components.

Table III-17
HFC: U.S. producers' U.S. shipments for use in apparent consumption for a single like product, 2013-15

* * * * * * *

Table III-18 presents data on U.S. producers' commercial U.S. shipments of in-scope components by channel and by product type in 2015. Virtually all (***) in-scope components were shipped to blenders and repackers while (***) of out-of-scope R-134a were shipped to blenders and repackers in 2015. By quantity, R-125 accounted for the largest share of in-scope components shipped in the United States in 2015 while R-143a comprised the smallest proportion of in-scope components shipped in the United States in 2015. Out-of-scope R-134a

was by far the largest volume HFC component shipped in the United States in 2015 due to its independent use in automotive air conditioners.[32]

Table III-18
HFC components: U.S. producers' commercial U.S. shipments of HFC components by product and by channel, 2015

* * * * * * *

Table III-19 presents data on U.S. producers' commercial U.S. shipments of in-scope blends by channel and product type in 2015. By volume, R-410A accounted for a majority of the volume of in-scope blends shipped in the United States while R-407C comprised the smallest proportion of in-scope blends shipped in the United States in 2015. The vast majority of in-scope blends were shipped to distributors, service companies, and/or directly to equipment owners (*** percent) or to OEMs (*** percent) in 2015.

Table III-19
HFC blends: U.S. producers' and blenders' commercial U.S. shipments of in-scope blends by product and by channel, 2015

* * * * * * *

U.S. PRODUCERS' AND BLENDERS' INVENTORIES

Table III-20 presents end-of-period inventories and the ratio of these inventories of in-scope components, out-of-scope R-134a, and in-scope blends to U.S. producers' production, U.S. shipments, and total shipments from 2013 to 2015.

Table III-20
HFC: U.S. producers' and U.S. blenders' inventories, 2013-15

* * * * * * *

U.S. PRODUCERS' AND BLENDERS' IMPORTS AND PURCHASES

U.S. producers' imports of in-scope products are presented in table III-21.[33] Five U.S. producers (***) imported in-scope components for use in blends from 2013 to 2015. Data on U.S. producers' imports include imports of out-of-scope component R-134a because it is a necessary component in the downstream production of three out of five in-scope blends. See

[32] Hearing transcript, p. 92 (Sassano), p. 93 (Minor), and p. 234 (Marshak).
[33] ***.

appendix D for detailed production, import, and purchase data of in-scope products by individual U.S. producers.

Table III-21
HFC: U.S. producers' ratio of in-scope imports to U.S. production based on single domestic like product co-extensive with Commerce's scope, 2013-15

* * * * * * *

U.S. EMPLOYMENT, WAGES, AND PRODUCTIVITY

Table III-22 shows U.S. producers' employment-related data from 2013 to 2015. The number of workers employed for in-scope components declined by *** percent from 2013 to 2015. The decline in PRWs for in-scope components is due to the closure of Chemours' R-125 plant in July 2015 and Honeywell's closure of one of its two R-125 plants in ***.[34]

U.S. producers employed more workers to produce in-scope blends than to produce in-scope components from 2013 to 2015, but the wages paid workers for in-scope components production (ranging from $*** per hour to $*** per hour) were consistently higher than the wages paid workers for in-scope blends production (ranging from $*** per hour to $*** per hour). For out-of-scope R-134a, the PRWs employed was higher than those employed for in-scope components while the wages paid to workers producing R-134a were lower than the wages paid to in-scope component operations, but higher than wages paid to in-scope blenders.

Table III-22
HFC: U.S. producers' employment related data, 2013-15

* * * * * * *

[34] ***.

PART IV: U.S. IMPORTS, APPARENT U.S. CONSUMPTION, AND MARKET SHARES

U.S. IMPORTERS

The Commission issued importer questionnaires to 36 firms believed to be importers of in-scope products, as well as to all U.S. producers of in-scope products and out-of-scope component R-134a producer.[1] [2] Usable questionnaire responses were received from 16 companies that accounted for over one-third (*** percent) of the in-scope products imported from China in 2015 under HTS statistical reporting numbers 2903.39.2030 (for in-scope components) and 3824.78.0000 (for in-scope blends).[3] [4] Table IV-1 lists all responding U.S.

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[1] The subject merchandise is referred to as "in-scope components" (R-32, R-125, and R-143a), "in-scope blends" (R-404A, R-407A, R-407C, R410A, and R-507A), and "in-scope products" (both in-scope components and blends combined). "Out-of-scope HFC component" and "R-134a" refer to the out-of-scope HFC component R-134a because it is an input for the production of three out of five in-scope blends. Although R-134a is excluded from the scope of the petition, data were collected for U.S. production, imports, and foreign production of R-134a. "HFC components" refer to R-32, R-125, R-143a, and out-of-scope R-134a. "Out-of-scope blends" or "refrigerant blends" refer to any refrigerant blend that uses at least one in-scope HFC component and is not one of the five in-scope blends listed above. These include all other refrigerant blends, including HFC, CFC, HCFC, and HFO blends, both proprietary and patented refrigerant blends. "U.S. producers" refer to producers of the in-scope components, blenders of in-scope blends, and reclaimers of in-scope blends and components. "Integrated producers" refer to the three U.S. producers (Arkema, Chemours, and Honeywell) of both in-scope components and blends while "stand-alone blenders/reclaimers" refer to firms reporting blending and/or reclaiming in-scope products but did not have HFC component production. Data for out-of-scope HFC component R-134a were gathered from U.S. producers, U.S. importers, and foreign producers/exporters in China and labeled accordingly.

[2] The Commission issued questionnaires to U.S. importers identified in the petition, along with firms that, based on a review of data provided by U.S. Customs and Border Protection ("Customs") and the record in the preliminary phase of this investigation under statistical reporting numbers 2903.39.2030 and 3824.78.0000 in 2015. Starting in January 2016, in-scope HFC products are classified in statistical reporting number 2903.39.2035 (a clean classification that includes only the three in-scope components) and statistical reporting number 3824.78.0020 (which includes the in-scope blends and other blends containing at least two in-scope components).

[3] Prior to 2016, the HTS categories (for both fluorocarbon single components and blends) had a wide variety of products in addition to refrigerants. Both provisions had chemicals and mixtures used for chemical synthesis, as well as finished products destined for specialty plastics, dielectric and cooling fluids in electric and transformer applications, and some medical uses – artificial blood or blood substitute, and anesthetics (such as operating room anesthesia).

[4] These HTS numbers are "basket categories" that include merchandise outside of the scope of this investigation, thereby understating the coverage of imports represented by questionnaire responses. Comparing the questionnaire data and public data for components separately from blends, staff believes questionnaire data demonstrate that in-scope blends have been classified in provisions other than statistical reporting number 3824.78.0000 from 2013 to 2015 since the responding U.S. importers'

(*continued*...)

importers of in-scope products, their headquarters, and their shares of reported U.S. imports, for 2015. The leading U.S. importer of in-scope components from China is National (***), while the leading importers of in-scope blends from China are ***. The two nonsubject importers of in-scope components are ***. No responding U.S. importer reported imports of in-scope blends from nonsubject sources in 2015.

Table IV-1
HFC: U.S. importers of in-scope products, their headquarters, and share of total imports by source, 2015

Firm	Headquarters	Share of imports by source (percent)					
		China	All other sources	Total imports	China	All other sources	Total imports
		In-scope components			In-scope blends		
Altair	Millburn, NJ	***	***	***	***	***	***
Arkema	King Of Prussia, PA	***	***	***	***	***	***
BMP	Tampa, FL	***	***	***	***	***	***
Chemours	Wilmington, DE	***	***	***	***	***	***
ComStar	College Point, NY	***	***	***	***	***	***
Coolgas	Bowling Green, OH	***	***	***	***	***	***
Daikin America	Orangeburg, NY	***	***	***	***	***	***
Honeywell	Morris Plains, NJ	***	***	***	***	***	***
Hudson	Pearl River, NY	***	***	***	***	***	***
ICOR	Indianapolis, IN	***	***	***	***	***	***
LM Supply	Tampa, FL	***	***	***	***	***	***
Mexichem	St. Gabriel, LA	***	***	***	***	***	***
National	Philadelphia, PA	***	***	***	***	***	***
Perfect Cycle	Dallas, TX	***	***	***	***	***	***
Refricenter	Miami, FL	***	***	***	***	***	***
Weitron	Newark, DE	***	***	***	***	***	***
Total		***	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

U.S. IMPORTS

Table IV-2 and figure IV-1 present data for U.S. imports of in-scope components from China and all other sources and table IV-4 and figure IV-2 present the same data for in-scope blends. When comparing in-scope components and blends, the majority of U.S. imports were in-scope components, with China as the primary source of these imports from 2013 to 2015. When comparing the three in-scope components, R-125 accounted for the largest share of imports in 2013, but declined in 2014 before increasing in 2015, with a decline of *** percent from 2013 to 2015. Table IV-3 presents data on U.S. imports of in-scope components from

(…*continued*)
questionnaire data for in-scope HFC blends exceed what is reported in official import statistics. For individual in-scope HFC components being reported under 2903.39.2030, staff believes that this provision includes mostly imports of other fluorinated hydrocarbons not covered by this investigation.

China by firm for 2013-15. The vast majority of in-scope components were imported by the largest four U.S. producers of in-scope products from 2013 to 2015.

Table IV-2
HFC components: U.S. imports of in-scope components, by source, 2013-15

* * * * * * *

Figure IV-1
HFC components: U.S. import volumes and prices for in-scope components, by source, 2013-15

* * * * * * *

Table IV-3
HFC components: U.S. imports of in-scope components from China, by firms, 2013-15

* * * * * * *

Table IV-4 and figure IV-2 present data for U.S. imports of in-scope blends from China and all other sources. Similar to the trend for U.S. imports of in-scope components, China dominated the U.S. imports for in-scope blends, accounting for the vast majority of U.S. imports of in-scope blends in 2013 to 2015. When comparing individual in-scope blends, R-410A accounted for over two-thirds of U.S. imports from 2013 to 2015.

Table IV-4
HFC blends: U.S. imports of in-scope blends, by source, 2013-15

* * * * * * *

Figure IV-2
HFC blends: U.S. import volumes and prices of in-scope blends, by source, 2013-15

* * * * * * *

Table IV-5 presents data on U.S. imports of in-scope blends from China by firm for 2013-15. The integrated producers and the largest blender did not import any in-scope blends from 2013 to 2015. As shown later in table IV-8, imports of in-scope blends were primarily commercially shipped.

Table IV-5
HFC blends: U.S. imports of in-scope blends from China, by firms, 2013-15

* * * * * * *

Table IV-6 presents data on U.S. importers' U.S. shipments, export shipments, and total shipments of in-scope components from China and nonsubject sources from 2013 to 2015. The vast majority, *** percent to *** percent, of U.S. importers' imports of in-scope components from China were consumed internally or transferred to related firms. U.S. importers' imports of in-scope components from nonsubject sources were shipped commercially or consumed

internally or transferred to related firms. All of the nonsubject imports shipped commercially were accounted for by one firm, ***, and it reported that these commercial shipments were sold to blenders/repackers. U.S. imports of in-scope components from China accounted for over 93 percent of overall U.S. imports of in-scope components from 2013 to 2015.

Table IV-6
HFC components: U.S. importers' shipments of in-scope components, by source and shipment type, 2013-15

* * * * * * *

Table IV-7 presents data on U.S. importers' commercial shipments of in-scope components and out-of-scope R-134a by channel of distribution and by product type for 2015. Shipments of R-32 accounted for the vast majority of in-scope components and were sold primarily to blenders and/or repackers. Unlike in-scope component R-32, R-134a was sold primarily to distributors, service companies, and/or directly to equipment owners. Unit values for the four main components of in-scope blends were mixed in 2015, with in-scope component R-125 being the most expensive, followed by out-of-scope R-134a in 2015.

Table IV-7
HFC components: U.S. importers' commercial U.S. shipments of in-scope components and R-134a imported from China, by product and channel, 2015

* * * * * * *

Tables IV-8 presents data on U.S. importers' U.S. shipments, export shipments, and total shipments of in-scope blends from China and nonsubject sources. The vast majority of U.S. importer shipments of in-scope blends from China as well as from all other sources were U.S. commercial shipments.

Table IV-8
HFC blends: U.S. importers' shipments of in-scope blends imported, by source and shipment type, 2013-15

* * * * * * *

Table IV-9 presents U.S. shipment data on in-scope blends by channel of distribution and by product type for 2015. In terms of total commercial shipments, U.S. importers primarily shipped imported R-410A (*** percent) and R-404A (*** percent) from China. Virtually all (*** to *** percent) U.S. commercial shipments were sent to distributors, service companies, and/or directly to equipment owners in 2015. There were no sales of in-scope blends to blenders and/or repackers in 2015. Unit values for the five in-scope blends had higher unit values when shipped to OEMs, but shipments to OEMs were much lower in quantity than shipments to distributors, service companies, and/or equipment owners.

Table IV-9
HFC blends: U.S. importers' commercial U.S. shipments of in-scope blends imported from China, by product and channel, 2015

* * * * * * *

NEGLIGIBILITY

The statute requires that an investigation be terminated without an injury determination if imports of the subject merchandise are found to be negligible.[5] Negligible imports are generally defined in the Tariff Act of 1930, as amended, as imports from a country of merchandise corresponding to a domestic like product where such imports account for less than 3 percent of the volume of all such merchandise imported into the United States in the most recent 12-month period for which data are available that precedes the filing of the petition or the initiation of the investigation. However, if there are imports of such merchandise from a number of countries subject to investigations initiated on the same day that individually account for less than 3 percent of the total volume of the subject merchandise, and if the imports from those countries collectively account for more than 7 percent of the volume of all such merchandise imported into the United States during the applicable 12-month period, then imports from such countries are deemed not to be negligible.[6] According to official Census data, U.S. imports of in-scope products (both components and blends) from China accounted for approximately 91 percent of total imports in the in the June 2014 to May 2015 period. U.S. imports of in-scope components from China accounted for approximately 91 percent of total imports and U.S. imports of HFC blends from China accounted for approximately 87 percent of total imports in the June 2014 to May 2015 period.[7]

CRITICAL CIRCUMSTANCES

On June 29, 2016, Commerce found that critical circumstances exist on imports of in-scope products from T.T. International Co., Ltd. ("T.T. International") and the PRC-wide entity.[8]

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[5] Sections 703(a)(1), 705(b)(1), 733(a)(1), and 735(b)(1) of the Act (19 U.S.C. §§ 1671b(a)(1), 1671d(b)(1), 1673b(a)(1), and 1673d(b)(1)).

[6] Section 771 (24) of the Act (19 U.S.C § 1677(24)).

[7] As noted in the beginning of Part IV, the HTS categories for both in-scope components and blends from 2013 to 2015 are "basket" categories that include merchandise outside the scope of this investigation. In particular, removing data based on proprietary Custom records for two firms that provided a completed U.S. importers' questionnaire response ***, both of which indicate their imports from sources other than China relate to out-of-scope merchandise, raise these percentages to 95 for both components and blends, 94 for components only, and 95 for blends only.

[8] *Hydrofluorocarbon Blends and Components Thereof from the People's Republic of China: Final Determination of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances,* 81 FR 42314, June 29, 2016.

In this investigation, if both Commerce and the Commission make affirmative final critical circumstances determinations, certain subject imports may be subject to antidumping duties retroactive by 90 days from February 1, 2016, the effective dates of Commerce's preliminary affirmative LTFV determination on imports of in-scope products from China. If the Commission determines that an industry in the United States is materially injured by reason of LTFV imports of in-scope products from China, it must further determine "whether the imports subject to the affirmative {Commerce critical circumstances} determinations . . . are likely to undermine seriously the remedial effect of the countervailing and antidumping duty orders to be issued."[9] The statute further provides that in making this determination, the Commission shall consider:

> (I) the timing and the volume of the imports,
> (II) a rapid increase in inventories of the imports, and
> (III) any other circumstances indicating that the remedial effect of the antidumping order will be seriously undermined.[10]

Table IV-10 presents monthly import data of HFC by U.S. importers from China, for the five and six month periods before and after the filing of the petition. Total U.S. imports from China were 2.7 percent higher in the six month period following the filing of the petition (July to December 2015) than in the six month period preceding the filing of the petition (January to June 2015).

[9] Section 735(b)(4)(A)(i) of the Act (19 U.S.C. § 1673d(b)(4)(A)(i)).
[10] Section 735(b)(4)(A)(ii) of the Act (19 U.S.C. § 1673d(b)(4)(A)(ii)).

Table IV-10

HFC: Official U.S. imports of HFCs from China in specific twelve month period, 2015

Month	U.S. imports subject to Commerce's final affirmative critical circumstance findings[1]		
	HFC components	HFC blends	HFC components and blends
	Quantity (short tons)		
2015.-- January	***	***	***
February	***	***	***
March	***	***	***
April	***	***	***
May	***	***	***
June	***	***	***
July	***	***	***
August	***	***	***
September	***	***	***
October	***	***	***
November	***	***	***
December	***	***	***
Subtotal, 6 months prior	***	***	***
Subtotal, 6 months post	***	***	***
Subtotal, 5 months prior	***	***	***
Subtotal, 5 months post	***	***	***

[1] U.S. imports from China from all suppliers except for firms not subject to Commerce's affirmative critical circumstance determination. These firms are: (1) Daikin Fluorochemicals (China) Co., Ltd.; (2) Jinhua Yonghe Fluorochemical Co., Ltd.; (3) Shandong Huaan New Material Co., Ltd.; (4) Weitron International Refrigeration Equipment (Kunshan) Co., Ltd.; (5) Zhejiang Yonghe Refrigerant Co., Ltd.; and, (6) Zhejiang Sanmei Chemical Industry Co., Ltd.

Source: Official U.S. import statistics using HTS statistical reporting numbers 2903.39.2030 (components a large basket category) and 3824.78.0000 (blends a somewhat basket category), less U.S. imports from China from specific exempt separate rate suppliers as identified using proprietary Customs records, accessed July 11, 2016 and 81 FR 42314, June 29, 2016.

APPARENT U.S. CONSUMPTION AND MARKET SHARES

Table IV-11 and figure IV-3 present data on apparent U.S. consumption market shares for in-scope components and blends combined. Apparent consumption, based on quantity, increased by *** percent during the 2013-15 period while apparent consumption, based on value, decreased by *** percent during the 2013-15 period. U.S. producers' share of apparent consumption decreased from 2013 to 2015, with a decrease of *** percentage points by quantity and a decrease of *** percentage points by value. The market share of in-scope products imported from China increased from 2013 to 2015, with an increase of *** percentage points by quantity and an increase of *** percentage points by value.

Table IV-11
HFC: Apparent U.S. consumption of in-scope products, 2013-15

* * * * * * *

Figure IV-3
HFC: Apparent U.S. consumption of in-scope products, 2013-15

* * * * * * *

PART V: PRICING DATA

FACTORS AFFECTING PRICES

Raw material costs

The primary raw material used in the production of HFC components is hydrofluoric acid (HF). The mineral form of calcium fluoride or fluorspar is used to produce HF; fluorspar is mined in only China and Mexico. [1] U.S. producer *** reported ***, and reported that the price for *** from 2013 to 2015.[2] In addition to HF, U.S. producers reported that *** is used to make R-32; *** to make R-125; and *** to make R-143a.

U.S. producers' raw material costs as a share of the cost of goods sold (COGS) increased from *** percent in 2013 to *** percent in 2015. Four of six responding U.S. producers reported that raw material prices have fluctuated since January 2013. U.S. producer *** reported that HF prices increased in 2014 but decreased in 2015. All U.S. producers reported buying most of their raw materials through long-term contracts.[3] Petitioners reported that prices for HF have *** ranging from 8.9 to 28.0 percent from 2013 to 2015. Producer *** reported a *** percent decrease in the price of *** from 2013 to 2015. Producers *** reported decreases of 2.3 and 21.0 percent (respectively) in the price of *** from 2013 to 2015. Producer *** reported 9.0 percent decreased in the price of *** from 2013 to 2015.[4]

Chinese respondents indicated that the price of raw materials has a direct effect on the price of HFC components and that prices for HFC blends are based on the proportioning the cost of the included HFC components.[5] Chinese producer *** reported that its raw material prices dropped by *** percent from January 2012 to June 2015.[6]

Most responding purchasers (15 of 18), indicated that raw material prices effected contract or spot prices of HFC blends and/ or components, with eight of those purchasers reporting that HFC prices are indexed to raw material prices. Purchaser *** reported that prices for *** and *** were tied to the ***.[7]

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[1] Chinese producers' posthearing brief p. 6 and exh. 2 and hearing transcript, pp. 190-191 (Beatty and Marshak).

[2] Petitioners' posthearing brief, exh. 1, p. 56.

[3] Petitioners' postconference brief, exh. 11, pp. 4-6.

[4] Petitioners' posthearing brief, exh. 1, pp. 53-55.

[5] Chinese producers' posthearing brief, p. 53

[6] Chinese producer *** did not update these estimates for the final phase of the investigation. Chinese producers' postconference brief, exh. 21.

[7] All other purchasers did not elaborate on how HFC components and blends are indexed to raw material prices.

U.S. inland transportation costs

All responding U.S. producers and importers reported that they typically arrange transportation to their customers. U.S. producers reported that their U.S. inland transportation costs ranged from 2 to 11 percent, averaging 5 percent; [8] while importers reported costs of 1 to 10 percent, averaging 4 percent.

PRICING PRACTICES

Pricing methods

U.S. producers and importers reported using a variety of pricing methods. As presented in table V-1, a majority of U.S. producers set prices for HFC components and blends using transaction-by-transaction negotiations. U.S. producer and importer *** reported that its prices are also set by ***. Importers reported setting prices for HFC components using transaction-by-transaction negotiations, contracts, and set price lists, and a majority of importers reported selling HFC blends on a transaction-by-transaction basis.

Table V-1

HFC blends and components: U.S. producers and importers reported price setting methods, by number of responding firms[1]

	U.S. producers	U.S. importers	U.S. producers	U.S. importers
Price setting method	HFC components		HFC blends	
Transaction-by-transaction	6	3	9	12
Contract	3	2	2	3
Set price list	1	1	3	4
Other	1	2	1	2

[1] The sum of responses down may not add up to the total number of responding firms as each firm was instructed to check all applicable price setting methods employed.

Source: Compiled from data submitted in response to Commission questionnaires.

U.S. producers reported selling most of their HFC components under long-term contract; while most of their HFC blends are sold in the spot market (table V-2). For HFC components, petitioners reported that contracts of any length typically have a fixed price and quantity and have meet-or-release clauses. Importers reported selling HFC components exclusively in the spot market and selling a majority of HFC blends in the spot market as well.

[8] Producer/reclaimer *** reported U.S. inland transportation costs of 100.0 percent, which was not included in the calculations.

Table V-2
HFC blends and components: U.S. producers' and importers' shares of U.S. commercial shipments by type of sale, 2015

* * * * * * *

Of the 21 responding purchasers, two purchasers reported that they purchase product daily, six purchase weekly, and ten purchase monthly. Twenty of 22 responding purchasers reported that their purchasing patterns had not changed in since 2013. The largest purchaser *** reported that it changed its purchasing patterns from smaller, more frequent purchases to larger *** purchases since 2013. Most (17 of 21) purchasers contact one to four suppliers before making a purchase.

Sales terms and discounts

U.S. producers and importers typically quote prices on a delivered basis.[9] A majority of U.S. producers and importers reported sales terms of net 30 days. A plurality of U.S. producers and importers reported offering no discounts on HFC components and blends (table V-3).[10] In addition, U.S. producer and importer *** reported offering ***, U.S. producer and importer *** reported offering ***, U.S. producer *** reported offering ***.

Table V-3
HFC blends and components: U.S. producers and importers reported discount policies, by number of responding firms[1]

	U.S. producers	U.S. importers	U.S. producers	U.S. importers
Discount policy	HFC components		HFC blends	
Quantity	1	1	3	6
Total volume	1	2	3	2
No policy	6	4	5	8
Other	1	1	2	2

[1] The sum of responses down may not add up to the total number of responding firms as each firm was instructed to check all applicable price setting methods employed.

Source: Compiled from data submitted in response to Commission questionnaires.

Price leadership

Eleven of 17 responding purchasers reported that all three petitioners (Arkema, Chemours, and Honeywell) were price leaders. Thirteen responding purchasers reported Chemours, and 12 purchasers each reported Arkema and Honeywell. Six purchasers reported

[9] Importer responses were split between f.o.b. and delivered basis for HFC components.
[10] A majority of U.S. producers reported offering no discounts for HFC components.

that the petitioners generally initiate price changes in the industry and other suppliers quickly follow. Four purchasers reported that importer BMP International was a price leader, with purchasers *** reporting that BMP broadcasts pricing via email at a lower price than the marketplace. Purchaser *** reported that Airgas United is a price leader.

Patents

Seven of 17 responding purchasers[11] reported that patents and/or licensing influence the price of HFC blends. Most responding firms reported that prices for patented blends were much higher than non-patented blends. Importer *** reported that once the patent expires, blends are considered to be commodities.

PRICE DATA

The Commission requested U.S. producers and importers to provide quarterly data for January 2013-December 2015 for the total quantity and f.o.b. value for the following four HFC blends (products 1-4) and two components (products 5-6).

Blends:

Product 1.—R-410A in bulk containers (1,000 lbs. or greater);

Product 2.—R-410A in 25-lb. disposable tanks or cylinders;

Product 3.—R-404A in 24-lb. disposable tanks or cylinders;

Product 4.—R-407C in 25-lb. disposable tanks or cylinders.

Components:

Product 5.—R-32 in bulk containers (1,000 lbs. or greater);

Product 6.—R-125 in bulk containers (over 1,000 lbs.).

[11] Purchaser *** reported multiple answers for this question and was not included in these calculations.

U.S. producers and importers were requested to provide data for shipments to unrelated U.S. customers. In addition, firms that imported HFC blends or components for their own use (i.e., blenders that imported components or OEMs that imported blends or components) were requested to provide import purchase cost data. Five U.S. producers[12] and nine importers provided usable pricing data for sales, and four importers provided direct import purchase cost data for the requested products, although not all firms reported pricing for all products for all quarters.[13]

Pricing data for sales of HFC blends reported by these firms accounted for approximately 80.1 percent of U.S. producers' commercial shipments of HFC blends and 92.3 percent of U.S. producer's U.S. commercial shipments of components in 2015.

Importers of Chinese product reported sales and direct import purchase cost data for all pricing products (table V-4). Direct import purchase cost data of HFC components (products 5 and 6) accounted for the majority of reported imports of HFC components. Importer ***, followed by ***, reported the highest volume of direct import purchase cost data for HFC components. Pricing data for importers of Chinese HFC components accounted for *** percent of U.S. commercial shipments of HFC components imported from China in 2015; importers *** reported the highest volume of pricing data for HFC components. Pricing data for sales of HFC blends (products 1-4) accounted for the majority of the reported imports of HFC blends. Pricing data for imports of Chinese HFC blends accounted for nearly all of the reported U.S. HFC blend commercial shipments in 2015; importer *** reported the highest volume of sales data for HFC blends. *** reported the highest volume of direct import purchase cost data for HFC blends.

Price data for products 1-6 are presented in tables V-5 to V-10 and figures V-1 to V-6.

Table V-4

HFC blends and components: U.S. importers' pricing and purchase cost data coverage, 2015

* * * * * * *

Table V-5

HFC blends: Weighted-average f.o.b. prices and quantities of domestic and imported product 1,[1] and margins of underselling/(overselling), by quarters, January 2013-December 2015

* * * * * * *

[12] The U.S. producers were asked to provide of the shares of pricing products 1-4 that consisted of domestic components versus imported components. Nearly all of *** pricing products 1-4 used domestically produced components. *** pricing products 1-4 consisted of *** percent of Chinese produced components.

[13] Per-unit pricing data are calculated from total quantity and total value data provided by U.S. producers and importers. The precision and variation of these figures may be affected by rounding, limited quantities, and producer or importer estimates.

Table V-6

HFC blends: Weighted-average f.o.b. prices and quantities of domestic and imported product 2,[1] and margins of underselling/(overselling), by quarters, January 2013-December 2015

* * * * * * *

Table V-7

HFC blends: Weighted-average f.o.b. prices and quantities of domestic and imported product 3,[1] and margins of underselling/(overselling), by quarters, January 2013-December 2015

* * * * * * *

Table V-8

HFC blends: Weighted-average f.o.b. prices and quantities of domestic and imported product 4,[1] and margins of underselling/(overselling), by quarters, January 2013-December 2015

* * * * * * *

Table V-9

HFC components: Weighted-average f.o.b. prices and quantities of domestic and imported product 5,[1] and margins of underselling/(overselling), by quarters, January 2013-December 2015

* * * * * * *

Table V-10

HFC components: Weighted-average f.o.b. prices and quantities of domestic and imported product 6,[1] and margins of underselling/(overselling), by quarters, January 2013-December 2015

* * * * * * *

Figure V-1

HFC blends: Weighted-average prices and quantities of domestic and imported product 1, by quarters, January 2013- December 2015

* * * * * * *

Figure V-2

HFC blends: Weighted-average prices and quantities of domestic and imported product 2, by quarters, January 2013-December 2015

* * * * * * *

Figure V-3

HFC blends: Weighted-average prices and quantities of domestic and imported product 3, by quarters, January 2013-December 2015

* * * * * * *

Figure V-4

HFC blends: Weighted-average prices and quantities of domestic and imported product 4, by quarters, January 2013- December 2015

* * * * * * *

Figure V-5

HFC components: Weighted-average prices and quantities of domestic and imported product 5, by quarters, January 2013- December 2015

* * * * * * *

Figure V-6

HFC components: Weighted-average prices and quantities of domestic and imported product 6, by quarters, January 2013-December 2015

* * * * * * *

Price trends

Domestic and Chinese sales prices and Chinese purchase costs decreased for most pricing products from 2013-15 (table V-11). For HFC components, domestic sales prices for product 5 were fairly steady from 2013 to 2015 and increased by ***percent overall while domestic sales prices for product 6 were extremely variable, decreasing by ***percent overall. Purchase costs for Chinese imports for product 5 increased by ***percent while purchase costs for Chinese imports for product 6 decreased by ***percent. Sales prices of imports of Chinese HFC components increased by *** percent for pricing product 6.[14]

For HFC blends, domestic prices for products 1, 3 and 4 decreased by ***to *** percent; while domestic prices for product 2 increased by *** percent. Prices of imported Chinese HFC blends decreased for products 2-4, ranging from *** to *** percent; while prices of imported Chinese product 1 increased by *** percent. Direct import purchase costs of all four HFC blend pricing products (products 1-4) decreased, by *** to *** percent.

As noted in Part II, sales of HFC blends tend to fluctuate seasonally, with the highest sales in the second quarter, in anticipation of warmer, summer months. Sales quantities of

[14] The price of imports from China for pricing product 5 was only available in two quarters; it decreased by *** percent. These changes were not comparable to that of the other country-product combinations for which prices were available for at least six quarters since 2013.

domestically produced HFC blends peaked during the second quarter of each full year for the period of investigation, and were typically at their lowest during the fourth quarter.

Table V-11

HFC blends and components: Summary of weighted-average f.o.b. prices for products 1-6 from the United States and China

Item	Number of quarters	Low price (dollars per pound)	High price (dollars per pound)	Change in price over period[1] (percent)
Product 1: United States	12	***	***	***
China-Sales	12	***	***	***
China-Purchase cost	11	***	***	***
Product 2: United States	12	***	***	***
China-Sales	12	***	***	***
China- Purchase cost	11	***	***	***
Product 3: United States	12	***	***	***
China-Sales	12	***	***	***
China- Purchase cost	12	***	***	***
Product 4: United States	12	***	***	***
China-Sales	12	***	***	***
China- Purchase cost	7	***	***	***
Product 5: United States	12	***	***	***
China-Sales	2	***	***	***
China- Purchase cost	12	***	***	***
Product 6: United States	12	***	***	***
China-Sales	6	***	***	***
China- Purchase cost	12	***	***	***

[1] Percentage change from the first quarter of 2013 to the fourth quarter of 2015.

Source: Compiled from data submitted in response to Commission questionnaires.

Price comparisons

As shown in table V-12, prices for HFC components imported from China were below those for U.S.-produced product in *** instances (***pounds); margins of underselling ranged from *** percent. In the remaining *** instances (***pounds), prices for HFC components imported from China were between *** percent above prices for the domestic product. Note that the volumes of U.S. commercial sales of imported Chinese components were a very small

share of total subject imports of components since most imports of Chinese components were direct imports by blenders and OEMs.

Prices for HFC blends imported from China were below those for U.S.-produced product in 42 of 48 instances (*** pounds); margins of underselling ranged from *** to *** percent. In the remaining *** instances (*** pounds), prices for HFC blends imported from China were between *** to *** percent above prices for the domestic product.

Table V-12

HFC blends and components: Instances of underselling/overselling and the range and average of margins, January 2013-December 2015

* * * * * * *

Direct import purchase costs

Importers that reported direct import purchase cost were requested to report the value of additional direct importing costs that are above and beyond the landed duty paid value. Of the seven responding importers, *** reported 2 percent, *** reported 11 percent, and other four responding importers reported 1 to 10 percent of the landed duty paid value of subject imports. Responding importers indicated that warehousing and insurance costs ranged from 1 to 2 percent of the landed duty paid value. Additionally, importers were asked to report the estimated margin saved by directly importing subject product. Importer *** reported that it saved approximately 3 to 5 percent of the landed duty paid value. Importer *** reported an estimated margin of 20 percent savings and further explained that Chinese suppliers did not offer long-term fixed prices, leading to variances in savings over time.

Importers were also asked to identify the benefits of directly importing HFC instead of purchasing HFC from a U.S. producer or importer. Three importers, ***, indicated that domestic producers are restricted from selling components manufactured by another domestic producer unless the component is a part of a blend. Importer *** reported that Chinese producers are able to supply all HFC components needed to produce blends whereas multiple domestic suppliers are needed to provide all HFC components. Importer *** reported that domestic producers did not sell to their business because it is a small regional refrigerant reclaim business and domestic suppliers already sell to larger distributor chains that serve the same areas. Petitioners *** reported that HFC components from China are priced lower than domestic product and that it is more cost effective to import. Importer *** reported that direct importing allows it to take advantage of its sister company's production and assets.

LOST SALES AND LOST REVENUE[15]

In the final phase of the investigation, of the 8 responding U.S. producers, 6 reported that they had to reduce prices and 3 reported that they had to roll back announced price increases. Five of 9 responding U.S. producers reported that they had lost sales. Staff received responses from 24 purchasers. Responding purchasers reported purchasing *** short tons of U.S.-produced HFC components and *** short tons of U.S.-produced HFC blends in 2015 (table V-13). Responding purchasers report no purchases of Chinese-produced HFC components and reported purchasing *** short tons of Chinese-produced HFC blends in 2015.[16]

Table V-13
HFC blends and components: Purchasers' responses to purchasing patterns

* * * * * * *

Two of four responding purchasers reported that they had shifted purchases of HFC components from U.S. producers to subject imports since 2013. *** was the only purchaser that reported price was the reason for the shift, and it reported shifting *** short tons of HFC components purchases (table V-14). Seven of 20 responding purchasers reported that they had shifted purchases of HFC blends from U.S. producers to subject imports since 2013.

Table V-14
HFC blends and components: Purchasers' responses to shifting supply sources

* * * * * * *

One of four responding purchasers reported that U.S. producers had reduced prices of HFC components in order to compete with lower-priced imports from China (table V-15a; two reported that they did not know). Petitioner *** reported an estimated price reduction of 1 percent.

Table V-15a
HFC components: Purchasers' responses to U.S. producer price reductions

* * * * * * *

Five of 17 responding purchasers reported that U.S. producers had reduced prices of HFC blends in order to compete with lower-priced imports from China (table V-15b; 10

[15] Lost sales and lost revenue information from the preliminary phase investigations are presented in appendix H.

[16] Some responding purchasers also reported being importers of Chinese HFC components.

reported that they did not know). The reported estimated price reduction ranged from 10 to 50 percent.

Table V-15b
HFC blends: Purchasers' responses to U.S. producer price reductions

* * * * * * *

PART VI: FINANCIAL EXPERIENCE OF U.S. PRODUCERS

BACKGROUND

Three U.S. producers, Arkema, Chemours, and Honeywell, reported usable financial results on in-scope HFC components (R-32, R-125, and R-143a). Five U.S. producers, Arkema, Chemours, Honeywell, ICOR, and National, reported usable financial results on their operations on in-scope HFC blends (404A, 407A, 407C, 410A, and 507A).[1] [2]

In addition to reporting that their HFC components and blends operations were negatively impacted by reduced market share and sales during the period,[3] the financial results of U.S. producers also reflect plant closures and manufacturing disruptions, as well as extended planned downtime.[4] With respect to other changes during the period, Chemours was formed as a stand-alone business (previously DuPont's Performance Chemicals segment) and became a publically traded company in July 2015.[5] While the spin off reportedly did not affect the manufacturing operations of Chemours in general,[6] ***.[7]

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[1] With the exception of ***, the U.S. industry's financial results were reported for calendar-year periods. Financial results were also primarily reported on the basis of generally accepted accounting principles (GAAP) with the exception being Arkema which reported its financial results on the basis of International Financial Reporting Standards (IFRS).

As described in Part I of this report, HFC components (in-scope and out-of-scope) are the primary inputs for the production of HFC blends. Because HFC components ultimately represent a large share of the total cost of goods sold (COGS) of HFC blends, financial results specific to HFC components and HFC blends are not additive. Accordingly, the financial results of HFC components and HFC blends are considered separately in this section of the report.

[2] Staff conducted an onsite verification of Chemours' U.S. producer questionnaire on May 18-19, 2016. Data changes pursuant to verification are reflected in this and other relevant sections of the staff report. Verification report (Chemours), pp. 2-3.

[3] Conference transcript, pp. 35-37 (Sassano), p. 41 (Irani), pp. 44-45 (Clark).

[4] *** U.S. producer questionnaire, response to II-2.

***. May 12, 2016 e-mail with attachment from *** to USITC auditor.

***. May 13, 2016 e-mail with attachment from *** to USITC auditor.

[5] "In order to reduce the impact of . . . cyclical volatility, which is inherent to the performance chemicals business, on its portfolio, DuPont decided to spin-off the division into a separate company in October {2013} last year." *Shift in Agricultural Sales Timing, Lower Chemical Prices Weigh On DuPont's Earnings Growth*, http://www.forbes.com/sites/greatspeculations/2014/04/24/shift-in-agricultural-sales-timing-lower-chemical-prices-weigh-on-duponts-earnings-growth/, retrieved July 15, 2015.

[6] Conference transcript, p. 89 (Buterbaugh). With regard to DuPont's decision to spin-off the Performance Chemical Division, a Chemours company official noted that ". . . given the market conditions in the fluorochemicals industry, particularly in the refrigerant business that we're talking about, clearly had an impact on their decision to evaluate whether to continue to invest . . ." Ibid.

[7] ***. Verification report (Chemours), p. 8.

OPERATIONS ON HFC COMPONENTS

U.S. producers' financial results on overall and merchant market HFC component operations are presented in table VI-1 and table VI-2, respectively.[8] Table VI-3 and table VI-4 present variance analyses of these financial results.[9]

Table VI-1
HFC components: Results of overall operations of U.S. producers, 2013-15

* * * * * * *

Table VI-2
HFC components: Results of commercial operations of U.S. producers, 2013-15

* * * * * * *

Table VI-3
HFC components: Variance analysis on the overall operations of U.S. producers, 2013-15

* * * * * * *

[8] Appendix E presents selected financial results information for overall and merchant market operations on HFC components by firm. Financial results on out-of-scope HFC component R-134a operations (overall and merchant market) are presented in Appendix F.

[9] The Commission's variance analysis is calculated in three parts: sales variance, cost of sales variance, and selling, general and administrative (SG&A) expense variance. Each part consists of a price variance (in the case of the sales variance) or a cost or expense variance (in the case of the cost of sales variance and SG&A expense variance), and a volume variance. The sales or cost/expense variance is calculated as the change in unit price or per-unit cost/expense times the new volume, while the volume variance is calculated as the change in volume times the old unit price or per-unit cost/expense. Summarized at the bottom of the table, the price variance is from sales; the cost/expense variance is the sum of those items from the cost of sales and SG&A variances, respectively, and the volume variance is the sum of the volume components of the net sales, cost of sales, and SG&A expense variances. In general, the utility of the Commission's variance analysis is enhanced when product mix remains the same throughout the period. ***. USITC auditor preliminary-phase notes.

Table VI-4
HFC components: Variance analysis on the commercial operations of U.S. producers, 2013-15

* * * * * * *

U.S. producers are specialized in terms of which in-scope HFC components they produce (see Part III of this report).[10] As noted in the *HFC component cost of goods sold* section below, *** are integrated with respect to a primary input (hydrofluoric acid (HF)) used in the production of in-scope HFC components. Pursuant to swap transactions, in which HFC components (in-scope and out- of-scope) are exchanged, U.S. producers are also integrated, in a manner of speaking, with respect to each other's operations.[11] For purposes of the Commission's U.S. producer questionnaire and as presented in table VI-1, in-scope HFC components manufactured and given up in exchange are recognized as swap revenue.[12] [13]

[10] Honeywell is the only producer of multiple in-scope HFC components (R-125 and R-143a). Arkema produces one in-scope HFC component (R-32) while Chemours closed its R-125 production facility at Deepwater, New Jersey on May 12, 2014 and no longer produces any in-scope HFC component.

[11] Conference transcript, p. 31 (Sassano). At the Commission's hearing, an industry witness stated that the magnitude of investment necessary to build an HFC component plant is in the range of "hundreds of millions of dollars" and that swaps ". . . help U.S. producers to achieve economies of scale and provide cost effective products to the marketplace." Hearing transcript, pp. 26-27 (Sassano). With respect to the objective and structure of swap arrangements, petitioners' posthearing brief also stated that "{s}waps are not used as a hedging device. Swaps are utilized in order to take advantage of economies of scale . . . and to minimize costs and provide better services to customers." Petitioners' posthearing brief (Exhibit 1), p. 48. With regard to intra-industry competition and the impact of swaps, petitioners posthearing brief noted that ". . . swaps do not detract from nor do they intensify the market factors that drive competition." Petitioners' postconference brief (Exhibit 1), p. 46. ***. Petitioners' postconference brief (Exhibit 1), pp. 46-47.

[12] As described in petitioners' postconference brief, "{t}he "effective" price paid for incoming swapped material is equal to the cost of the outgoing swapped material, times swap ratio . . . companies adjust the swap ratios to take account of any difference in the market values between the products." Petitioners' posthearing brief (Exhibit 1), p. 46. ***. Verification report (Chemours), p. 4. ***. Petitioners' postconference brief (Exhibit 15).

[13] In addition to swaps made directly between two U.S. producers, "Geographic" swaps reflect transactions in which there is no direct link in terms of the HFC components produced and exchanged; e.g., ***. July 21, 2015 e-mail with attachments from *** to USITC auditor. ***. May 13, 2016 e-mail with attachment from *** to USITC auditor.

HFC components revenue

When considering overall operations on HFC components, the majority of revenue represents swaps (*** percent of total sales volume),[14] followed by internal consumption (*** percent), commercial sales (*** percent), and a relatively small share of transfers (*** percent). As shown in table VI-1, the directional pattern of each revenue type varied; e.g., while overall commercial sales volume declined in each year, swap volume increased and internal consumption was mixed (declining in 2014 and then increasing marginally in 2015). The company-specific pattern of sales volume was also mixed with *** reporting an increase in internal consumption volume in 2015 and *** reporting a decline (see table E-1).[15] As noted previously, ***. *** reported a decline in internal consumption in 2014 and *** internal consumption in 2015.

HFC components cost of goods sold

As noted in Part I of this report, the primary material inputs are hydrofluouric acid (HF) and specific "chlorine starting components" (methylene chloride for HFC component R-32, trichloroethylene (TCE) or perchloroethylene (PCE) for HFC component R-125, and methyl

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[14] At the Commission's hearing, an industry witness stated that ". . . swaps are a not-uncommon practice within the chemical industry, particularly when you're dealing with commodity chemicals. They can be driven on the basis of location where you'll have producers producing a chemical, a commodity, in either two different parts of the country, the northwest and the southeast, for example, and the benefit of a swap, which is volume-oriented only, is that you save on transportation or logistics costs." Hearing transcript, pp. 83-84. To support the assertion that swaps are not unusual, petitioners' posthearing brief cited previous cases in which swaps were a routine activity within the U.S. industry examined by the Commission. Petitioners' posthearing brief (Exhibit 1), pp. 43-44.

With respect to the GAAP accounting treatment in general, swap transactions are nonmonetary exchanges (specifically exchanges of inventory for similar products) that would normally be recognized at carrying value, as opposed fair value. Under these circumstances and because the earnings process has not been completed, profit or loss on the swap transactions would generally not be recognized. Wiley GAAP 2002, p. 363. Wiley GAAP 2012, pp. 831-832. As presented in this section of the report and analogous to the Commission's treatment of internal consumption, HFC components given up in a swap exchange have been reported (in terms of revenue) at fair market value and therefore contribute to profit or loss on overall HFC component financial results.

With regard to the tax implications of swap arrangements, petitioners' posthearing brief stated that "{t}ax treatment does not factor at all into the decision to engage in a swap. The domestic producers value the swap materials at the cost of manufacture, which is then multiplied by the swap ratio. This is reconciled on a monthly basis, so it is the same total cost in dollars before and after. Therefore, there are no tax consequences . . . {p}etitioners are unaware of any IRS regulations or rulings regarding the tax treatment of swaps of manufactured products." Petititioners' posthearing brief (Exhibit 1), pp. 47-48.

[15] ***. May 12, 2016 e-mail with attachment from *** to USITC auditor.
***. May 13, 2016 e-mail with attachment from *** to USITC auditor.

chloroform for HFC component R-143a).[16] As shown in table VI-1, raw material costs are the largest part of HFC component COGS ranging from *** percent (2013) to *** percent (2015).

Average raw material cost remained within a somewhat narrower range for overall HFC component operations (see table VI-1) as compared to merchant market operations (see table VI-2). On a company-specific basis, average raw material cost was also mixed in terms of amount and directional trend with *** reporting the highest average raw material cost for the *** years that it had HFC component operations (see table E-1).[17] [18] ***, which consistently reported the *** average raw material cost, stated that primary input costs *** during the period.[19] *** reported that its primary HFC component costs increased in 2014 and then declined somewhat in 2015.[20]

Average conversion cost (direct labor and other factory costs) declined during the period examined for both overall and merchant market operations (see table VI-1 and table VI-2). (Note: Conversion cost includes the expense into COGS of previously capitalized plant turnaround costs. Plant turnarounds take place on a recurring basis every two to three years depending on the company.) On a company-specific basis *** average conversion cost declined within a relatively narrow range while *** average conversion cost declined more notably in 2015 (see table E-1 and table E-2).[21] ***.[22]

HFC components gross profit or loss

Table VI-1 shows that overall HFC component operations generated gross losses of declining magnitude in 2013 and 2014 and a gross profit in 2015. Merchant market HFC operations reported a similar directional pattern in terms of gross profit (see table VI-2).

On a company-specific basis (see table E-1 and table E-2) *** generated gross losses on its merchant market HFC component operations throughout the period while on its overall operations it reported gross profit somewhat above breakeven in 2013 and 2014 and a gross loss in 2015. Regarding this pattern, ***.[23] ***, in contrast reported improvement in the level of gross profit generated in 2015, particularly with respect to overall operations, as compared

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[16] ***. Verification report (Chemours), p. 3.

The Commission's current practice requires that relevant cost information associated with inputs purchased from related suppliers correspond to the manner in which this information is reported in the U.S. producer's own accounting books and records. See 1,1,1,2-Tetrafluoroethane from China, Inv. Nos. 701-TA-509 and 731-TA-1244 (Final), USITC Publication 4503, December 2014, pp. 23 and 37.

[17] ***. May 12, 2016 e-mail with attachment from *** to USITC auditor.

[18] When comparing company-specific average raw material costs, and average COGS in general, it should be remembered that the underlying in-scope HFC components produced by each company were for the most part different which limits direct comparability.

[19] ***. May 12, 2016 e-mail with attachment from *** to USITC auditor.

[20] ***. May 13, 2016 e-mail with attachment from *** to USITC auditor.

[21] ***.

[22] Verification report (Chemours), pp. 6-7.

[23] ***. May 13, 2016 e-mail with attachment from *** to USITC auditor.

to gross losses reported in 2013 and 2014.[24] ***, which generated relatively large losses in 2013 and 2014, ***.

HFC components SG&A expenses and operating income or loss

While the pattern of operating income or loss for both overall and merchant market HFC component operations was largely a function of financial results at the gross level, the assignment of SG&A expenses was also a factor to some extent. Total SG&A expenses were relatively stable in 2013 and 2014 followed by a decline in 2015. Similarly, corresponding SG&A expense ratios (total SG&A expenses divided by total revenue) were about the same in 2013 and 2014 and then declined somewhat in 2015.[25]

HFC components interest expense, other expenses, and net income or loss

Below operating results, relatively small amounts of interest expense were reported throughout the period along with smaller amounts of other expenses and other income.[26] The absolute amount and directional trend of net income was therefore primarily a function of profitability at the gross and operating levels.

OPERATIONS ON HFC BLENDS

U.S. producers' financial results on their HFC blends operations are presented in table VI-5.[27] A variance analysis of HFC blends financial results is presented in table VI-6.[28]

HFC blending operations presented in table VI-5 include integrated HFC component producers noted in the previous section (Arkema, Chemours, Honeywell) and non-integrated producers (ICOR and National) who blend HFC components. Unlike operations on overall HFC components, where a large share of production is internally consumed, HFC blends are generally sold to third parties. Additionally and while HFC component swap transactions facilitate the production of downstream HFC blends, finished HFC blends are themselves not swapped.

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[24] ***. *** U.S. producer questionnaire response, response II-9. USITC auditor final-phase notes.

[25] ***. Verification report, p. 7.

[26] ***. Verification report (Chemours), p. 3.

[27] Table E-3 presents selected financial results information on HFC blends operations by firm. Financial results on out-of-scope refrigerant blends are presented in F-3.

[28] See footnote 9.

Table VI-5
HFC blends: Results of overall operations of U.S. producers, 2013-15

* * * * * * *

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Table VI-6
HFC blends: Variance analysis on the operations of U.S. producers, 2013-15

* * * * * * *

HFC blends revenue

The majority of HFC blend revenue reflects commercial sales (*** percent of total sales volume) and a small amount of transfers (*** percent). As shown in table VI-5, overall HFC blend sales volume increased in 2014 and then declined in 2015 to somewhat below the level reported in 2013. Table E-3 shows that most U.S. producers reported increases in sales volume in 2014 while the pattern in 2015 was mixed with the overall decline in sales volume primarily reflecting ***.[29] [30]

Table E-3 shows that company-specific average sales values reflect a relatively broad range with *** consistently reporting the highest amount. While magnitudes differed, all U.S. producers reported declines in average sales value in 2014. In contrast, the pattern was mixed in 2015.

HFC blends cost of goods sold

As noted above, HFC blend operations reflect integrated producers that manufacture one or more of the HFC components (in-scope and/or out-of-scope), as well as producers whose primary operations reflect HFC blending. The breakout of costs presented in table VI-5 therefore reflects different levels of activity which are not applicable to all U.S. producers.

On an overall basis purchased or swapped components (U.S. origin) made up the largest share of total HFC blends COGS (ranging from *** percent (2013) to *** percent (2015)),[31] followed by internally-produced HFC components (in-scope and out-of-scope) (ranging from

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[29] ***. May 12, 2016 e-mail with attachment from *** to USITC auditor.

[30] ***. May 12, 2016 e-mail with attachment from *** to USITC auditor.

[31] This line item includes purchases of U.S.-produced HFC components, as well as swaps received. In general, the cost recognized for swapped material received is the cost of the component given up in the exchange. July 21, 2015 e-mail with attachment from *** to USITC auditor. July 21, 2015 e-mail with attachment from *** to USITC auditor. July 21, 2015 e-mail with attachments from *** to USITC auditor.

***. *** U.S. producer questionnaire, response to III-3b.

*** percent (2015) to *** percent (2013),[32] purchased HFC components (imported) (ranging from *** percent (2015) to *** percent (2013)), other factory costs (blending operations) (ranging from *** percent (2015) to *** percent (2013)), direct labor (blending operations) (ranging from *** percent (2013) to *** percent (2014)), and recovered HFC components or blends (ranging from 0.03 percent (2015) to 0.06 percent (2013)).[33]

Taken as a whole, the sum of the HFC components part of COGS is the most significant (ranging from *** percent (2014) to *** percent (2015)) and on an average basis declined somewhat from *** per short ton in 2013 to *** per short ton in 2015. As shown in table E-3, the directional trend of company-specific HFC blend COGS was mixed in 2014 and 2015. While integrated producers were for the most part in a similar range, *** average COGS increased throughout the period which is in contrast with *** whose average COGS declined generally.[34]

***, which purchases its HFC components from both domestic and foreign sources, identified its primary material inputs as ***.[35] ***, which reported the *** 2015 decline in average HFC blend COGS, indicated that the primary HFC component inputs costs were somewhat lower in that year (see footnote 20).

Value added

In general, the Commission estimates "value added" by determining the share of conversion costs (direct labor and other factory costs) to total COGS. Based on the information reported to the Commission and when considered as a group, value added calculated for integrated producers (Arkema, Chemours, Honeywell) on their HFC blending operations ranged from *** percent (2015) to *** percent (2013). Value added for ***, an HFC blender, ranged from *** percent (2013) to *** percent (2014). ***.[36]

HFC blends gross profit or loss

Table VI-5 shows a sharp decline in total gross profit and gross profit ratio in 2014 followed by an increase in 2015 to levels similar to 2013. The overall deterioration in HFC blend gross profit ratio in 2014 reflects a decline in average sales value which outpaced the

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[32] The "cost of internally-produced components" represents HFC components produced and consumed by the same U.S. producer in the production of HFC blends and recognized as part of COGS in this table.

[33] ***. May 9, 2016 e-mail with attachments (response to follow-up questions and revised U.S. producer questionnaire) from *** to USITC auditor.

[34] ***. May 12, 2016 e-mail with attachment from *** to USITC auditor.

[35] May 12, 2016 e-mail with attachments (response to follow-up questions and revised tables III-12 and V-3) from *** to USITC auditor.

[36] USITC auditor final-phase notes. With regard to the integrated producers, value added is an estimate based on available information and would be higher if conversion costs associated with components swapped out, considered in the same level of detail as internally-produced and consumed components, were included. Ibid.

corresponding decline in average COGS. In contrast, the relative improvement in gross profit ratio in 2015 reflects a continued decline in average COGS and a marginal increase in average sales value.

On a company-specific basis the pattern of gross profitability was mixed (see table E-3). *** reported gross losses of increasing magnitude in 2013 and 2014 and then a gross profit in 2015.[37] In contrast, *** reported substantially higher gross profit levels in 2013 followed by a sharp decline in 2014 and a modest recovery in 2015. *** reported an increase in gross profit in 2014, partially offsetting the declines reported by ***, and then a modest decline in 2015 to a gross profit level which was still somewhat higher compared to 2013. *** reported generally stable gross profit in 2013 and 2014 followed by a relatively large increase in 2015.[38]

HFC blends SG&A expenses and operating income or loss

As shown in table VI-5, total SG&A expenses declined during 2013-15. While corresponding SG&A expense ratios also declined somewhat, the pattern of HFC blends operating results primarily reflects the directional trend of gross profitability.[39]

HFC blends interest expense, other expenses, and net income or loss

Below operating results, relatively small amounts of interest expense were reported during 2013-15 along with a somewhat larger level of other expenses and other income.[40] While these items had a modest impact, the absolute amount and directional trend of HFC blends net income was primarily a function of profitability at the gross and operating levels.

[37] ***. May 13, 2016 e-mail with attachment from *** to USITC auditor.

[38] ***. May 12, 2016 e-mail with attachments (response to follow-up questions and revised tables III-12 and V-3) from *** to USITC auditor.

[39] Table F-3 shows that overall out-of-scope refrigerant blend financial results were *** compared to in-scope HFC blend financial results which was also generally the case on a company-specific basis. ***. May 12, 2016 e-mail with attachment from *** to USITC auditor. ***. May 12, 2016 e-mail with attachment from *** to USITC auditor.

[40] While *** was the only U.S. producer to report interest expense, *** accounted for the majority of other expenses and other income.

CAPITAL EXPENDITURES AND RESEARCH AND DEVELOPMENT EXPENSES

Table VI-7 presents firm-specific capital expenditures and research and development (R&D) expenses related to operations on HFC components and blends, respectively.

Table VI-7
HFC components and blends: Capital expenditures and research and development (R&D) expenses of U.S. producers, 2013-15

* * * * * * *

Capital expenditures attributed to HFC component operations declined during 2013-15 with *** both reporting their highest levels in 2013.[41] In contrast, *** reported its highest level in 2015.

HFC blend capital expenditures, which were lower compared to HFC component capital expenditures, declined somewhat in 2014 and then increased in 2015. The higher level of capital expenditures in 2015 was due to *** which both reported their largest capital expenditures in that year.[42] In contrast, *** reported its highest level of capital expenditures in 2013 which reflects investments in ***.[43]

*** were the only U.S. producers to report R&D expenses during the period. ***.[44]

***.[45]

ASSETS AND RETURN ON INVESTMENT

Tables VI-8 presents U.S. producers' property, plant and equipment (PP&E), total assets,[46] asset turnover (sales divided by total assets), and return on assets (operating income

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[41] ***. *** U.S. producer questionnaire, response to III-13 (notes 1 and 3). With regard to capital expenditures reported for its HFC component operations, ***. *** U.S. producer questionnaire, response to III-13 (note 1).

[42] ***. *** U.S. producer questionnaire, response to III-13 (note 3).

[43] *** U.S. producer questionnaire, response to III-13 (note 3).

[44] July 21, 2015 e-mail with attachment from *** to USITC auditor.

[45] *** U.S. producer questionnaire (revised), response to III-13 (note 4). ***. Verification report (Chemours), p. 8.

[46] With respect to a company's overall operations, staff notes that a total asset value (i.e., the bottom line value on the asset side of a company's balance sheet) reflects an aggregation of a number of assets which are generally not product specific. Accordingly, high-level allocation factors presumably were required in order to report a total asset value specific to operations on HFC components and HFC blends, respectively. As such, it should be noted that the pattern of asset values reported can reflect

(*continued*...)

or loss divided by total assets) on overall operations on HFC components and HFC blends, respectively.

Table VI-8

HFC components and blends: U.S. producers' property, plant and equipment (PP&E), total assets, asset turnover, and return on assets, 2013-15

* * * * * * *

CAPITAL AND INVESTMENT

The Commission requested U.S. producers of HFC components and blends to describe any actual or potential negative effects on their return on investment or their growth, investment, ability to raise capital, existing development and production efforts (including efforts to develop a derivative or more advanced version of the product), or the scale of capital investments as a result of imports of HFC components and blends from China. Table VI-9 tabulates the responses on actual negative effects on investment, growth and development, as well as anticipated negative effects.[47] Table G-1 presents the narrative responses of U.S. producers regarding actual and anticipated negative effects of HFC components and blends from China on investment, growth and development.

(…*continued*)

changes in underlying asset account balances, as well as period-to-period variations in relevant allocation factors.

[47] The following U.S. producers did not report usable financial results but, as appropriate, are reflected in table VI-9 and table G-1: ***. USITC auditor final-phase notes.

Table VI-9
HFC blends and components: Negative effects of imports from subject sources on investment, growth, and development since January 1, 2013

Item	No	Yes
Negative effects on investment[1]	4	4
Cancellation, postponement, or rejection of expansion projects		2
Denial or rejection of investment proposal		0
Reduction in the size of capital investments		3
Return on specific investments negatively impacted		1
Other		3
Negative effects on growth and development[2]	3	5
Rejection of bank loans		1
Lowering of credit rating		0
Problem related to the issue of stocks or bonds		0
Ability to service debt		1
Other		5
Anticipated negative effects of imports[3]	4	5

[1] The following U.S. producers reported that they experienced no negative effects on investment due to subject imports: ***. The following U.S. producers reported that they did experience negative effects on investment: ***.

[2] The following U.S. producers reported that they experienced no negative effects on growth and development due to subject imports: ***. The following U.S. producers reported that they did experience negative effects on growth and development: ***.

[3] The following U.S. producers reported that they anticipated no negative effects due to subject imports: ***. The following U.S. producers reported that they did anticipate negative effects: ***.

Source: Compiled from data submitted in response to Commission questionnaires.

PART VII: THREAT CONSIDERATIONS AND INFORMATION ON NONSUBJECT COUNTRIES

Section 771(7)(F)(i) of the Act (19 U.S.C. § 1677(7)(F)(i)) provides that—

> *In determining whether an industry in the United States is threatened with material injury by reason of imports (or sales for importation) of the subject merchandise, the Commission shall consider, among other relevant economic factors*[1]*--*
>
> *(I) if a countervailable subsidy is involved, such information as may be presented to it by the administering authority as to the nature of the subsidy (particularly as to whether the countervailable subsidy is a subsidy described in Article 3 or 6.1 of the Subsidies Agreement), and whether imports of the subject merchandise are likely to increase,*
>
> *(II) any existing unused production capacity or imminent, substantial increase in production capacity in the exporting country indicating the likelihood of substantially increased imports of the subject merchandise into the United States, taking into account the availability of other export markets to absorb any additional exports,*
>
> *(III) a significant rate of increase of the volume or market penetration of imports of the subject merchandise indicating the likelihood of substantially increased imports,*
>
> *(IV) whether imports of the subject merchandise are entering at prices that are likely to have a significant depressing or suppressing effect on domestic prices, and are likely to increase demand for further imports,*
>
> *(V) inventories of the subject merchandise,*

---

[1] Section 771(7)(F)(ii) of the Act (19 U.S.C. § 1677(7)(F)(ii)) provides that "The Commission shall consider {these factors} . . . as a whole in making a determination of whether further dumped or subsidized imports are imminent and whether material injury by reason of imports would occur unless an order is issued or a suspension agreement is accepted under this title. The presence or absence of any factor which the Commission is required to consider . . . shall not necessarily give decisive guidance with respect to the determination. Such a determination may not be made on the basis of mere conjecture or supposition."

(VI) the potential for product-shifting if production facilities in the foreign country, which can be used to produce the subject merchandise, are currently being used to produce other products,

(VII) in any investigation under this title which involves imports of both a raw agricultural product (within the meaning of paragraph (4)(E)(iv)) and any product processed from such raw agricultural product, the likelihood that there will be increased imports, by reason of product shifting, if there is an affirmative determination by the Commission under section 705(b)(1) or 735(b)(1) with respect to either the raw agricultural product or the processed agricultural product (but not both),

(VIII) the actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the domestic like product, and

(IX) any other demonstrable adverse trends that indicate the probability that there is likely to be material injury by reason of imports (or sale for importation) of the subject merchandise (whether or not it is actually being imported at the time).[2]

Information on the volume and pricing of imports of the subject merchandise is presented in *Parts IV* and *V*; and information on 0the effects of imports of the subject merchandise on U.S. producers' existing development and production efforts is presented in *Part VI*. Information on inventories of the subject merchandise; foreign producers' operations, including the potential for "product-shifting;" any other threat indicators, if applicable; and any dumping in third-country markets, follows. Also presented in this section of the report is information obtained for consideration by the Commission on nonsubject countries.

[2] Section 771(7)(F)(iii) of the Act (19 U.S.C. § 1677(7)(F)(iii)) further provides that, in antidumping investigations, ". . . the Commission shall consider whether dumping in the markets of foreign countries (as evidenced by dumping findings or antidumping remedies in other WTO member markets against the same class or kind of merchandise manufactured or exported by the same party as under investigation) suggests a threat of material injury to the domestic industry."

THE INDUSTRY IN CHINA

The Commission issued foreign producers' or exporters' questionnaires to 18 firms believed to produce and/or export in-scope products from China.[3] Useable responses to the Commission's questionnaire were received from 16 firms: A-Gas (Shanghai) Chemical Co., Ltd. ("A-Gas Shanghai"); Arkema Daikin Advanced Fluorochemicals (Changshu) Co., Ltd. ("Arkema Daikin"); Daikin Fluorochemicals (China) Co. Ltd. ("Daikin China"); Honeywell; Huantai Dongyue International Trade Co., Ltd. ("Huantai Dongyue"); Jinhua Yonghe Fluorochemical Co., Ltd. ("Jinhua Yonghe"); Shandong Dongyue Chemical Co., Ltd. ("Shangdong Dongyue"); Sinochem Taicang; Sinochem Lantian Trading Co., Ltd. ("Sinochem Lantian"); TT International Co., Ltd. ("TT"); Weitron International Refrigeration Equipment (Kunshan) Co., Ltd. ("Weitron Kunshan"); Zhejiang Lantian Environmental Protection Fluoro Material Co., Ltd. ("Zhejiang Lantian"); Zhejiang Quhua; Zhejiang Quzhou Lianzhou Refrigerants Co., Ltd. ("Zhejiang Quzhou"); Zhejiang Sanmei; and, Zhejiang Yonghe Refrigerant Co., Ltd. ("Zhejiang Yonghe") in China. Seven firms produced in-scope components, nine produced in-scope blends, with five firms being integrated producers of both in-scope components and blends.[4]

Compared with official Commerce statistics, responding producers/exporters in China accounted for (*** percent) of total exports of in-scope components to the United States in 2015. This number likely understates coverage as the HTS numbers used for official U.S. import statistics were basket categories in 2015. Compared with responding U.S. importers of in-scope components, responding producers/exporters in China accounted for approximately (*** percent) of total imports of in-scope components.[5] Of all the responding HFC producers/exporters in China, *** is the largest producer of in-scope components and *** is the largest producer of in-scope blends. Table VII-1 presents information on the in-scope operations of responding producers in China.

Table VII-1
HFC: Summary data on firms in China, 2015

* * * * * * *

Table VII-2 presents information on responding Chinese producers' changes in both in-scope component and blending operations from 2013-15. Since 2013, producers in China have started one new R-32 plant, three new R-125 plants, one new R-143a plant, and one new R-410A blending facility.[6] During 2013-15, five in-scope components producers in China have also

[3] These firms were identified through a review of information submitted in the petition, a review of proprietary Customs records, and the record in the preliminary phase of this investigation.

[4] Five responding foreign producers/exporters in China, ***, are exporters of in-scope products and did not report production of in-scope products from 2013 to 2015.

[5] Responding producers/exporters in China make up the majority in-scope components and blends exported to the United States in 2015.

[6] Respondents argue that Chinese producers were able to expand capacity and production for in-scope products because patents expired completely in 2011 for in-scope blends in the United States and

(*continued*...)

reported capacity expansions from 2013-15 and one in-scope blender in China reported expanding its in-scope blending capacity. Since 2013, only one producer in China, (***), reported a shutdown of an in-scope component plant (R-32) and a reduction of in-scope blending operation for R-410A.

Table VII-2
HFC: Chinese producers' reported changes in operations since January 1, 2013

* * * * * * *

Table VII-3 presents data on the in-scope component industry in China.[7] [8] Capacity and production both increased from 2013 to 2015 for producers of in-scope components in China. Shipments to all markets increased from 2013 to 2015, with shipments to the United States increasing slightly, from *** short tons in 2013 to *** short tons in 2015. For in-scope component producers in China, in-scope component production was primarily internally consumed or transferred to produce in-scope blends from 2013 to 2015. Table VII-2 provides information on a number of new in-scope plants in China coming online as well as several in-scope production increases from 2013 to 2015 which may explain these increases in capacity, production, and shipments in China of in-scope components.

Table VII-3
HFC components: Data on in-scope HFC component industry in China, 2013-15, and projected 2016-17

* * * * * * *

Table VII-4 presents data from 2013 to 2015 on China's top destinations for exports of HFC components which include out-of-scope merchandise such as acetylene tetrabromide, alkyl bromides, methylene dibromide, and vinyl bromide. In both quantity and value, the United States was China's top destination over this period, with the quantity of China's export to the United States increasing overall from 2013 to 2015, despite a decline in 2014. In terms of value, China's exports to the United States followed the same pattern, increasing from 2013 to 2015

(…*continued*)
in 2012 for in-scope blend R-410A in China. In addition, respondents argue that the U.S. Department of Transportation approval of multiple Chinese firms to manufacturer DOT-39 cylinders to ship in-scope blends allowed Chinese suppliers to export packaged blends in cylinders ready for sale to distributors and service centers. Prior to the approval of Chinese made DOT-39 cylinders, U.S. importers would have to purchase bulk containers (mostly restricted to OEMs) or ship DOT-39 cylinders back and forth (impractical due to shipping costs). National's prehearing brief, p. 45, 49-50 and exh. 9, Chinese producers/exporters' posthearing brief, p. 13, and hearing transcript, p. 199-200 (Beatty).

[7] The four responding producers of R-134a in China reported that R-134a is not produced on the same machinery as in-scope components.

[8] Only one *** out of seven responding producers of in-scope components in China reported producing other products using the same equipment as in-scope components. This production accounted for approximately *** percent of overall production in 2015.

but with a decline from 2013 to 2014. In terms of unit value, China's exports of HFC components to countries other than the United States were generally higher than China's exports to the United States in 2013 and 2015. The unit values in 2014 were more mixed.

Table VII-4
HFC components: Chinese exports under HTS 2903.39 (basket category for in-scope HFC components), by destination market, 2013-15

Item	Calendar year		
	2013	2014	2015
	Quantity (short tons)		
China's exports to the United States	57,065	42,129	64,108
China's exports to other major destination markets.--			
Netherlands	12,388	17,942	23,334
Japan	14,734	16,613	17,344
Korea South	11,466	11,694	11,637
Taiwan	7,014	7,424	8,281
Brazil	5,987	8,313	7,742
Mexico	1,734	3,514	7,472
Thailand	4,536	4,980	7,052
France	2,835	5,010	5,960
All other destination markets	77,173	85,703	84,060
Total China exports	194,932	203,323	236,990
	Value (1,000 dollars)		
China's exports to the United States	184,244	135,733	192,031
China's exports to other major destination markets.--			
Netherlands	45,121	60,349	97,655
Japan	61,079	62,221	64,316
Korea South	38,556	37,458	39,754
Taiwan	21,495	21,779	23,535
Brazil	18,992	21,790	21,676
Mexico	5,634	9,391	17,937
Thailand	13,241	12,588	18,256
France	14,370	16,233	19,482
All other destination markets	257,731	252,954	255,803
Total China exports	660,462	630,495	750,444

Table continued on next page.

Table VII-4--*Continued*
HFC components: Chinese exports under HTS 2903.39 (basket category for in-scope HFC components), by destination market, 2013-15

Item	Calendar year		
	2013	2014	2015
	Unit value (dollars per short ton)		
China's exports to the United States	3,229	3,222	2,995
China's exports to other major destination markets.--			
Netherlands	3,642	3,363	4,185
Japan	4,145	3,745	3,708
Korea South	3,363	3,203	3,416
Taiwan	3,065	2,934	2,842
Brazil	3,172	2,621	2,800
Mexico	3,248	2,672	2,400
Thailand	2,919	2,527	2,589
France	5,069	3,240	3,269
All other destination markets	3,340	2,952	3,043
Total China exports	3,388	3,101	3,167
	Share of quantity (percent)		
China's exports to the United States	29.3	20.7	27.1
China's exports to other major destination markets.--			
Netherlands	6.4	8.8	9.8
Japan	7.6	8.2	7.3
Korea South	5.9	5.8	4.9
Taiwan	3.6	3.7	3.5
Brazil	3.1	4.1	3.3
Mexico	0.9	1.7	3.2
Thailand	2.3	2.4	3.0
France	1.5	2.5	2.5
All other destination markets	39.6	42.2	35.5
Total China exports	100.0	100.0	100.0

Source: Official Chinese exports statistics under HTS subheading 2903.39 as reported by China Customs in the GTIS/GTA database, accessed May 19, 2016.

Table VII-5 presents data on the in-scope blends industry in China for the nine responding producers of in-scope blends in China. Capacity and production both increased from 2013 to 2015 for producers of in-scope blends in China. Shipments to all markets also increased from 2013 to 2015, with shipments to the United States more than quadrupling, from *** short tons in 2013 to *** short tons in 2015. Table VII-2 provided information on a number of new in-scope plants in China coming online as well as several in-scope capacity increases from 2013 to 2015 which may explain the increased capacity, production, and shipments of in-scope blends.

Table VII-5
HFC blends: Data on in-scope blends industry in China, 2013-15, and projected 2016-17

* * * * * * *

Table VII-6 presents data on other products produced using the same machinery as in-scope blends by producers in China. Overall capacity to producer all blends increased from 2013 to 2015, with the production of in-scope blends increasing each year while the production of other products decreased each year. The production of in-scope blends represents the vast majority (ranging from 90 percent to 95 percent) of overall production. Seven out of nine producers of in-scope blends reported the ability to switch production among the five in-scope blends while five out of nine reported the ability to switch production from in-scope blends to out-of-scope blends. Two firms, ***, reported producing in-scope blends while they were under previous patent protection.

Table VII-6
HFC blends: Chinese producers of in-scope blends' overall production and capacity, 2013-15

* * * * * * *

Table VII-7 presents data on China's top destinations for exports of HFC blends from 2013 to 2015 using official GTIS/GTA data which include out-of-scope blends containing perfluorocarbons. In both quantity and value, the United States went from being the largest market by a small amount for refrigerant blends from China in 2013 to being the destination by a factor of more than two for refrigerant blends from China in 2015. Overall, China increased its exports of refrigerant blends to the world from 2013 to 2015, increasing by more than 70 percent in quantity and by 47 percent in value.

Table VII-7
HFC blends: Chinese exports under HTS 3824.78 (basket category for in-scope HFC blends), by destination market, 2013-15

Item	Calendar year		
	2013	2014	2015
	Quantity (short tons)		
China's exports to the United States	8,692	12,690	26,653
China's exports to other major destination markets.--Thailand	6,364	8,208	10,080
Korea	4,109	5,598	7,128
Japan	6,499	7,252	6,419
Russia	5,033	6,036	6,349
Netherlands	969	2,439	6,122
Brazil	2,239	3,577	4,958
Turkey	2,424	2,541	4,030
India	1,113	2,134	3,540
All other destination markets	31,751	44,099	42,448
Total China exports	69,193	94,574	117,726
	Value (1,000 dollars)		
China's exports to the United States	26,784	34,964	72,198
China's exports to other major destination markets.--Thailand	17,669	20,145	23,682
Korea	12,685	16,242	19,960
Japan	35,329	33,601	27,563
Russia	16,938	19,224	19,550
Netherlands	3,117	6,876	16,847
Brazil	8,422	13,412	17,010
Turkey	7,803	7,569	11,667
India	3,578	5,961	9,234
All other destination markets	102,612	133,606	126,747
Total China exports	234,937	291,600	344,459

Table continued on next page.

Table VII-7--*Continued*
HFC blends: Chinese exports under HTS 3824.78 (basket category for in-scope HFC blends), by destination market, 2013-15

Item	Calendar year		
	2013	2014	2015
	Unit value (dollars per short ton)		
China's exports to the United States	3,081	2,755	2,709
China's exports to other major destination markets.--Thailand	2,776	2,454	2,349
Korea	3,087	2,901	2,800
Japan	5,436	4,634	4,294
Russia	3,366	3,185	3,079
Netherlands	3,215	2,820	2,752
Brazil	3,762	3,749	3,431
Turkey	3,219	2,979	2,895
India	3,215	2,793	2,608
All other destination markets	3,232	3,030	2,986
Total China exports	3,395	3,083	2,926
	Share of quantity (percent)		
China's exports to the United States	12.6	13.4	22.6
China's exports to other major destination markets.--Thailand	9.2	8.7	8.6
Korea	5.9	5.9	6.1
Japan	9.4	7.7	5.5
Russia	7.3	6.4	5.4
Netherlands	1.4	2.6	5.2
Brazil	3.2	3.8	4.2
Turkey	3.5	2.7	3.4
India	1.6	2.3	3.0
All other destination markets	45.9	46.6	36.1
Total China exports	100.0	100.0	100.0

Source: Official Chinese exports statistics under HTS subheading 3824.78 as reported by China Customs in the GTIS/GTA database, accessed May 19, 2016.

U.S. INVENTORIES OF IMPORTED MERCHANDISE

Tables VII-8 presents data on U.S. importers' inventories of in-scope components and blends. In 2013 and 2014, U.S. importers' inventories of in-scope components were higher than inventories of in-scope blends. In 2015, U.S. importers' inventories of both in-scope components and blends increased dramatically, with inventories of in-scope blends exceeding those of in-scope components.

Table VII-8
HFC: U.S. importers' end-of-period inventories of imported in-scope products by source, 2013-15

* * * * * * *

U.S. IMPORTERS' OUTSTANDING ORDERS

The Commission requested importers to indicate whether they imported or arranged for the importation of in-scope products from China after December 31, 2015. Table VII-9 presents U.S. importers' responses on their outstanding orders of in-scope products. Twelve out of sixteen responding U.S. importers of in-scope components and blends indicated that they imported or arranged for importation of in-scope products from China after December 31, 2015.[9]

Table VII-9
HFC: Arranged imports of in-scope products, January 2016 through December 2016

* * * * * * *

ANTIDUMPING OR COUNTERVAILING DUTY ORDERS IN THIRD-COUNTRY MARKETS

Only one responding producer/exporter of in-scope product in China *** reported that 410-A produced in Qingpu, China is subject to U.S. duties. The European Union ("EU") has placed a non-tariff barrier in the form of regulatory restrictions on products that contribute to global warming, which includes all the components and blends subject to this investigation, with the goal of reducing emissions of fluorinated greenhouse gasses.[10]

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[9] Two firms, (***), indicated that they did not import or arrange for importation of HFC from China after March 31, 2015.

[10] *REGULATION (EU) No 517/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006.* Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0517&qid=1437675187485&from=EN on July 23, 2015 and hearing transcript, p. 192-193 (Beatty).

INFORMATION ON NONSUBJECT COUNTRIES

In assessing whether the domestic industry is materially injured or threatened with material injury "by reason of subject imports," the legislative history states "that the Commission must examine all relevant evidence, including any known factors, other than the dumped or subsidized imports, that may be injuring the domestic industry, and that the Commission must examine those other factors (including non-subject imports) 'to ensure that it is not attributing injury from other sources to the subject imports.'"[11]

Tables VII-10 and VII-11 present data on world exports of HFC components and blends, respectively.

[11] *Mittal Steel Point Lisas Ltd. v. United States*, Slip Op. 2007-1552 at 17 (Fed. Cir. Sept. 18, 2008), quoting from Statement of Administrative Action on Uruguay Round Agreements Act, H.R. Rep. 103-316, Vol. I at 851-52; *see also Bratsk Aluminum Smelter v. United States*, 444 F.3d 1369 (Fed. Cir. 2006).

Table VII-10

HFC components: Global exports under HTS 2903.39 (basket category for in-scope HFC components), by exporter, 2013-15

Item	Calendar year		
	2013	2014	2015
	Quantity (short tons)		
United States	91,027	90,211	70,067
China	194,932	203,323	236,990
All other major exporting countries.--Netherlands	23,973	28,977	27,761
France	19,919	16,103	18,347
Japan	11,638	10,036	15,787
United Kingdom	12,369	12,406	15,436
Belgium	9,472	10,417	10,856
Germany	10,440	11,204	10,161
Italy	4,669	5,540	5,427
India	594	1,030	2,823
Singapore	3,342	2,896	2,476
Mexico	1,306	1,860	1,215
All other exporting countries	18,318	13,242	6,905
Total global exports	401,999	407,244	424,139
	Share of value (percent)		
United States	22.6	22.2	16.6
China	48.5	49.9	56.2
All other major exporting countries.--Netherlands	6.0	7.1	6.6
France	5.0	4.0	4.4
Japan	2.9	2.5	3.7
United Kingdom	3.1	3.0	3.7
Belgium	2.4	2.6	2.6
Germany	2.6	2.8	1.8
Italy	1.2	1.4	1.3
India	0.1	0.3	0.7
Singapore	0.8	0.7	0.6
Mexico	0.3	0.5	0.3
All other exporting countries	4.6	3.3	1.6
Total global exports	100.0	100.0	100.0

Source: Official exports statistics under HTS subheading 2903.39 as reported by various national statistical authorities in the GTIS/GTA database, accessed May 19, 2016.

Table VII-11

HFC blends: Global exports under HTS 3824.78 (basket category for in-scope HFC blends), by exporter, 2013-15

Item	Calendar year		
	2013	2014	2015
	Quantity (short tons)		
United States	13,636	17,144	11,699
China	69,193	94,574	117,726
All other major exporting countries.--Netherlands	17,747	17,682	24,597
France	8,291	9,682	15,545
Belgium	3,111	3,761	4,778
United Kingdom	6,629	3,841	3,796
Taiwan	3,727	3,482	3,699
Germany	2,298	1,800	2,952
Italy	1,687	2,203	1,491
Spain	6,242	4,370	1,397
Malaysia	231	578	1,218
Singapore	900	1,056	1,106
All other exporting countries	3,564	3,999	3,806
Total global exports	137,256	164,126	193,857
	Share of value (percent)		
United States	9.9	10.4	6.0
China	50.4	57.6	60.7
All other major exporting countries.--Netherlands	12.9	10.8	12.7
France	6.0	5.9	8.0
Belgium	2.3	2.3	2.5
United Kingdom	4.8	2.3	2.0
Taiwan	2.7	2.1	1.9
Germany	1.7	1.1	1.5
Italy	1.2	1.3	0.8
Spain	4.5	2.7	0.7
Malaysia	0.2	0.4	0.6
Singapore	0.7	0.6	0.6
All other exporting countries	2.6	2.4	2.0
Total global exports	100.0	100.0	100.0

Source: Official exports statistics under HTS subheading 3824.78 as reported by various national statistical authorities in the GTIS/GTA database, accessed May 19, 2016.

The production of HFC components is concentrated in a few countries. Since blending is a less capital-intensive activity, that portion of the industry is not tracked as closely. Therefore, the following discussion is based on data regarding HFC components.

China and the United States dominate the global HFC industry, combining for a total of *** percent of in-scope component capacity in 2013 and at least *** percent of in-scope

component production in 2012. Nonsubject producers in Western Europe and Japan accounted for the balance of the in-scope HFC industry.[12]

The production figures for Western Europe are aggregated for all HFCs, including out-of-scope components such as R-134a, so in-scope component production is less than the number used in these discussions. More specific details are available for capacity at the different facilities. Therefore, while Western Europe's aggregated HFC production (including out-of-scope components) represented *** percent of global production of the in-scope components, its 2013 capacity for the in-scope components represented only about *** percent of the global total capacity for the in-scope components.[13]

Western Europe's 2013 capacity for *** was *** percent of the global total capacity for each of those components. With regard to ***, the 2013 European capacity represented *** percent of global total capacity for that HFC component. Western Europe's capacity for R-134a, an out-of-scope component, was greater than its capacity for all three of the in-scope components combined in 2013.[14]

Western European exports of all HFC components, both in-scope and out-of-scope, were aggregated. The primary exports markets for these HFCs were the Middle East, northern Africa, Asia, and the United States.[15]

The Japanese HFC industry primarily focused on the production of R-134a. Japanese production of in-scope HFC components was at least *** percent of the global total in 2012. Japanese exports of the in-scope components in 2013 were quite limited and were generally shipped to other Asian destinations. The Japanese fluorocarbon industry produces HCFCs as precursors for polymers.[16]

[12] ***.
[13] ***.
[14] ***.
[15] ***.
[16] ***.

APPENDIX A

FEDERAL REGISTER NOTICES

The Commission makes available notices relevant to its investigations and reviews on its website, www.usitc.gov. In addition, the following tabulation presents, in chronological order, *Federal Register* notices issued by the Commission and Commerce during the current proceeding.

Citation	Title	Link
81 FR 5098, February 1, 2016	*Hydrofluorocarbon Blends and Components Thereof from the People's Republic of China: Preliminary Determination of Sales at Less Than Fair Value, Affirmative Preliminary Determination of Critical Circumstances, in Part, and Postponement of Final Determination*	https://www.gpo.gov/fdsys/pkg/FR-2016-02-01/pdf/2016-01767.pdf
81 FR 10662, March 1, 2016	*Hydrofluorocarbon Blends and Components From China; Scheduling of the Final Phase of an Antidumping Duty Investigation*	https://www.gpo.gov/fdsys/pkg/FR-2016-03-01/pdf/2016-04399.pdf
81 FR 42314, June 29, 2016	*Hydrofluorocarbon Blends and Components Thereof from the People's Republic of China: Final Determination of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances*	https://www.gpo.gov/fdsys/pkg/FR-2016-06-29/pdf/2016-15298.pdf

APPENDIX B

LIST OF HEARING WITNESSES

CALENDAR OF PUBLIC HEARING

Those listed below appeared as witnesses at the United States International Trade Commission's hearing:

Subject: Hydrofluorocarbon Blends and Components from China

Inv. No.: 731-TA-1279 (Final)

Date and Time: June 21, 2016 - 9:30 a.m.

Sessions were held in connection with this investigation in the Main Hearing Room (Room 101), 500 E Street, S.W., Washington, DC.

OPENING REMARKS:

Petitioners (**James R. Cannon, Jr.**, Cassidy Levy Kent (USA) LLP)
Respondents (**Ned H. Marshak**, Grunfeld Desiderio Lebowitz Silverman & Klestadt LLP *and* **Jarrod M. Goldfeder**, Trade Pacific PLLC)

In Support of the Imposition of Antidumping Duty Order:

Cassidy Levy Kent (USA) LLP
Washington, DC
on behalf of

American HFC Coalition

Richard Rowe, Chief Executive Officer, Arkema Inc.

Glen Haun, Director of Sales, Arkema Inc.

Allison Clark, General Manager Functional Additives, Arkema Inc.

Dean McCoy, Logistics Department Loader, Arkema *and* Financial Secretary for Local 1969, International Association of Machinists and Aerospace Workers

Elizabeth Mary Sassano, Global Business and Market Manager, Refrigerants, The Chemours Company, LLC

In Support of the Imposition of
Antidumping Duty Orders (continued):

James Bachman, North American Business Manager,
The Chemours Company, LLC

Magen L. Buterbaugh, Global Business Manager, Fluorochemicals,
The Chemours Company, LLC

Omar Irani, Director, Global Products Management, Fluorine
Products, Honeywell International Inc.

Richard Winick, Business Director, Automotive Products,
Honeywell International Inc.

David Cooper, Business Director, Stationary Refrigerants,
Honeywell International Inc.

Thomas W. Morris, Director of Business Development,
Fluorine Products, Honeywell International Inc.

Barbara Minor, Chemours Fellow, The Chemours Company, LLC

Deirdre Maloney, Senior Trade Advisor, Cassidy Levy
Kent (USA) LLP

James R. Cannon, Jr.)
Jack Levy) – OF COUNSEL
Nazak Nikakhtar)

In Opposition to the Imposition of
Antidumping Duty Order:

Grunfeld Desiderio Lebowitz Silverman & Klestadt LLP
Washington, DC
on behalf of

Chinese Respondents

James P. Dougan, Vice President, Economic Consulting Services LLC

Jennifer Lutz, Senior Economist, Economic Consulting Services LLC

Max F. Schutzman)
Ned H. Marshak) – OF COUNSEL
Kavita Mohan)

In Opposition to the Imposition of
Antidumping Duty Orders (continued):

Trade Pacific PLLC
Washington, DC
on behalf of

National Refrigerants, Inc.

Maureen Beatty, Executive Vice President, National Refrigerants, Inc.

Rob Yost, Technical Director, National Refrigerants, Inc.

Jarrod M. Goldfeder)
) – OF COUNSEL
Jonathan M. Freed)

Trade Law Defense PLLC
Alexandria, VA
on behalf of

ICOR International Inc.

James Tieken, Owner and Founder, ICOR International Inc.

Frank Morgan) – OF COUNSEL

INTERESTED PARTY:

New Era Group
Atlanta, GA

Peter Williams, President, New Era Group

REBUTTAL/CLOSING REMARKS:

Petitioners (**James R. Cannon, Jr.** *and* **Jack Levy**, Cassidy Levy Kent (USA) LLP)
Respondents (**Ned H. Marshak**, Grunfeld Desiderio Lebowitz Silverman & Klestadt LLP *and* **Jarrod M. Goldfeder**, Trade Pacific PLLC))

APPENDIX C

SUMMARY DATA

Table	Treatment of blends vs components	Expansions (if applicable)
C-1	Single like product (“SLP”): In-scope components and in-scope blends	None: Co-extensive with scope
C-2a	Separate like product: In-scope components only	None: Co-extensive with scope
C-2b	Separate like product: In-scope blends only	None: Co-extensive with scope
C-3	Single like product (“SLP”) + R-134a	Scope + R-134a
C-4	Single like product (“SLP”) + out-of-scope blends	Scope + out-of-scope blends
C-5	Single like product (“SLP”) + R-134a + out-of-scope blends	Scope + R-134a + out-of-scope blends
C-6a	Separate like product: In-scope components + R-134a	In-scope components + R-134a
C-6b	Separate like product: In-scope blends + out-of-scope blends	In-scope blends + out-of-scope blends

Table C-1

HFC: Summary data concerning the U.S. market (a single domestic like product co-extensive with Commerce's scope), 2013-15

* * * * * * *

Table C-2a

HFC: Summary data concerning the U.S. markets (separate domestic like products for blends and components co-extensive with Commerce's scope: components), 2013-15

* * * * * * *

Table C-2b

HFC: Summary data concerning the U.S. markets (separate domestic like products for blends and components co-extensive with Commerce's scope: blends), 2013-15

* * * * * * *

Table C-3

HFC: Summary data concerning the U.S. market (a single domestic like product co-extensive with Commerce's scope plus R-134a: SLP + R134a), 2013-15

* * * * * * *

Table C-4

HFC: Summary data concerning the U.S. market (a single domestic like product co-extensive with Commerce's scope plus out-of-scope blends: SLP + Other blends), 2013-15

* * * * * * *

Table C-5

HFC: Summary data concerning the U.S. market (a single domestic like product co-extensive with Commerce's scope plus R-134a and other out-of-scope blends: SLP + R134a + Other blends), 2013-15

* * * * * * *

Table C-6a

HFC: Summary data concerning the commercial U.S. markets for in-scope components plus R-134a, 2013-15

* * * * * * *

Table C-6b

HFC: Summary data concerning the total U.S. markets for in-scope HFC blends plus out-of-scope blends, 2013-15

* * * * * * *

APPENDIX D

PRODUCTION, IMPORT, AND PURCHASE DATA ON IN-SCOPE PRODUCTS BY ALL U.S. PRODUCERS

Table D-1
HFC: U.S. producer * U.S. production and U.S. imports from China of merchandise subject to this investigation, 2013-15**

* * * * * * *

Table D-2
HFC: U.S. producer * U.S. production and U.S. imports from China of merchandise subject to this investigation, 2013-15**

* * * * * * *

Table D-3
HFC: U.S. producer * U.S. production and U.S. imports from China of merchandise subject to this investigation, 2013-15**

* * * * * * *

Table D-4
HFC: U.S. producer * U.S. production and U.S. imports from China of merchandise subject to this investigation, 2013-15**

* * * * * * *

Table D-5
HFC: U.S. producer * U.S. production and U.S. imports from China of merchandise subject to this investigation, 2013-15**

* * * * * * *

Table D-6
HFC: U.S. producer * U.S. production and U.S. imports from China of merchandise subject to this investigation, 2013-15**

* * * * * * *

Table D-7
HFC: U.S. producer * U.S. production and U.S. imports from China of merchandise subject to this investigation, 2013-15**

* * * * * * *

APPENDIX E

FINANCIAL RESULTS ON HFC COMPONENTS (OVERALL OPERATIONS AND MERCHANT MARKET) AND HFC BLENDS (OVERALL OPERATIONS) BY FIRM

Table E-1
HFC components: Results of overall operations of U.S. producers, by firm, 2013-15

* * * * * * *

Table E-2
HFC components: Results of commercial operations of U.S. producers, by firm, 2013-15

* * * * * * *

Table E-3
HFC blends: Results of overall operations of U.S. producers, by firm, 2013-15

* * * * * * *

APPENDIX F

FINANCIAL RESULTS ON OUT-OF-SCOPE HFC COMPONENT R-134A (OVERALL AND MERCHANT MARKET) AND OUT-OF-SCOPE REFRIGERANT BLENDS (OVERALL)

Table F-1
R-134a: Results of overall operations of U.S. producers, 2013-15

* * * * * * *

Table F-2
R-134a: Results of commercial operations of U.S. producers, 2013-15

* * * * * * *

Table F-3
Out-of-scope refrigerant blends: Results of overall operations of U.S. producers, 2013-15

* * * * * * *

APPENDIX G

NARRATIVE STATEMENTS REGARDING ACTUAL AND ANTICIPATED NEGATIVE IMPACT DUE TO SUBJECT IMPORTS

Table G-1
HFC components and blends: Narrative responses of U.S. producers regarding actual and anticipated negative effects of imports from subject sources on investment, growth, and development since January 1, 2013

* * * * * * *

APPENDIX H

LOST SALES AND LOST REVENUE ALLEGATIONS FROM THE PRELIMINARY PHASE OF THE INVESTIGATIONS

Effective October 1, 2015, the Commission changed its rules associated with domestic industry provision of allegations of lost sales and lost revenue. The Commission rules were changed to ask petitioners to provide a list of purchasers where they lost sales or revenue, instead of transaction-specific incidents. This appendix contains the information from the preliminary phase related to lost sales and lost revenue allegations under the prior Commission rules as provided in the preliminary phase staff report.

The Commission requested U.S. producers of HFC blends and components to report any instances of lost sales or revenue they experienced due to competition from imports of HFC blends and components from China since January 1, 2012. The 47 lost sales allegations totaled $53.4 million and involved 22.9 million pounds of in-scope HFC blends, and the 27 lost revenue allegations totaled $63.0 million and involved 41.3 million pounds of HFC blends. [1] HFC blend R-410A accounted for 34 of the 47 lost sales allegations and 17 of the 27 lost revenue allegations.

Purchasers responding to the lost sales allegations also were asked whether they shifted their purchases of HFC blends and components from U.S. producers to suppliers of HFC blends and components from China since 2012. In addition, they were asked whether U.S. producers reduced their prices in order to compete with suppliers of HFC blends and components from China. Two of the 20 responding purchasers reported that they had shifted purchases of HFC from U.S. producers to subject imports since 2012; both of these purchasers reported that price was the reason for the shift. Two purchasers reported that U.S. producers had reduced their prices in order to compete with the prices of subject imports since 2012. Responding purchaser *** reported that generally, U.S. producers reduced their prices several times per quarter, with decreases ranging from *** to *** percent.[2]

Staff contacted 20 purchasers, and a summary of the information obtained follows in tables H-1 and H-2.

Table H-1
HFC: U.S. producers' lost sales allegations

* * * * * * *

Table H-2
HFC: U.S. producers' lost revenue allegations

* * * * * * *

[1] U.S. producers did not provide lost sale or lost revenue allegations for HFC components.
[2] *** reported that it did not know if it shifted its purchases of HFC from U.S. producer to subject imports or if U.S. producer had reduced their prices in order to compete with Chinese import prices since 2012. *** indicated that between 80.0 to 90.0 percent of its purchases were from U.S. producers and that maintaining competitive material costs was critical to its operation.

APPENDIX I

U.S. PRODUCERS' PRODUCTION OF BLENDS BASED ON THE ORIGIN OF THE INPUT COMPONENTS

Table I-1
HFC: U.S. producers' production of blends based on origin of the input components, 2013-15

* * * * * * *